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The Yellow Plague

J. F. D. SHREWSBURY *

"IT can hardly be doubted that the devastation of Britain by pestilence in the seventh century (and of all Europe shortly before), little as it bulks in the annals, was one chief reason why the centuries following were emphatically the Dark Ages."[24] The worst pestilence that afflicted England in the seventh century appears to have been the one that broke out in A.D. 664, and which made that year possibly one of the decisive years in English history. It swept over a country that had been exposed to the ravages of invasion and of internecine strife for more than two centuries, and it seems probable that it exerted a profound effect upon the political development of the peoples of Britain. "This year," runs the entry in the *Anglo-Saxon Chronicle*,[2] "the sun was eclipsed on the 5th before the Nones of May," that is, on the 1st of May, and "the same year there was a great pestilence in the island of Britain."

The bare notice of this pestilence in the Chronicle tells us little about its severity or its extent, except that the use of the name Britain presumably included England and Wales. Bede, who was a contemporary of it, is more informative, but he has omitted much that we should like to know, and his omissions are surprising in view of the authority conceded to him by modern historians. "In the same year of our Lord 664," he says, "there happened an eclipse of the sun, on the third day of May, about the tenth hour of the day. In the same year, a sudden pestilence depopulated first the southern parts of Britain, and afterwards attacking the province of the Northumbrians, ravaged the country far and near and destroyed a great multitude of men. By this plague, the aforesaid priest of the Lord, Tuda, was carried off, and was honorably buried in the monastery called Paegnalaech. Moreover, this plague prevailed no less disastrously in the island of Ireland. Many of the nobility, and of the lower ranks of the English nation, were there at that time. . . ."[57] They were either studying or leading monastical lives, because at that time Ireland was the repository of the culture and learning which had been expunged from Western Europe by the irruptions of the barbarians that had destroyed the Roman Empire in the West.

* University of Birmingham.

It is unwise to rely upon translations of ancient works, but Sellar's translation that I have quoted appears to be—as far as my poor knowledge of Latin enables me to judge—a faithful rendering of the passage in Plummer's edition* of Bede,[55] which is, I believe, accepted by historians as the authoritative version. Sellar adds a footnote to her translation that the pestilence was called the "Yellow Pest" from the colour of its victims. Unfortunately, she quotes no authority in support of this statement, or in support of her succeeding statement that "it was a bubonic plague." If the victims exhibited a yellow coloration of the body, then the pestilence was not bubonic plague. Giles,[10] in his translation of the above passage from Bede, interpolates the statement that the pestilence was called the "Yellow Plague." He also gives no ancient authority for this interpolation, and presumably it does not occur in any of the Bede manuscripts, otherwise Plummer would surely have included it in his edition. The fact that neither Bede nor Plummer gives a name to this pestilence is considered by purist historians to exclude the possibility that it could have been called the Yellow Plague, although it has been commonly referred to under that name by numerous writers, some of whom could claim to write with authority. Giles appears to have been regarded as a reputable scholar and translator in his day, and it seems hardly credible that he would have interpolated a statement of such significance without authority for it, because it is a literary crime to add something to a translation that is not in the original without authority for the addition. As Giles is no longer able to defend himself, and as even Plummer was not infallible, one must admit the possibility, in fairness to Giles, that he believed that he had authority for the interpolation.

There can be no doubt that the people who suffered from it gave some name to the pestilence, and the fact that Bede omitted to mention the name suggests that, having set out to write a history of the early English Church, he was not particularly interested in the condition of the laity. His omission certainly does not prove that the pestilence was not called the Yellow Plague. He was not an infallible recorder, because he made a careless and inexcusable error in the date of the solar eclipse, and he obviously exaggerated when he stated that the pestilence depopulated

* Eodem autem anno dominicae incarnationis DCLXIIII, facta erat eclipsis solis die tertio mensis Maii, hora circiter, X[a] diei; quo etiam anno subita pestilentiae lues, depopulatis prius australibus Brittaniae plagis, Nordanhymbrorum quoque provinciam corripiens, atque acerba clade diutius longe lateque desaeviens, magnam hominem multitudinem stravit. Qua plaga praefatus Domini sacerdos Tuda raptus est de mundo, et in monasterio, quod vocatur Paegnalacch, honorifice sepultus. Haec autem plaga Hiberniam quoque insulam pari clade premebat. Erant ibidem eo tempore multi nobilium simul et mediocrium de gente Anglorum. . . .

the southern parts of Britain, although there is evidence from other sources that it caused a heavy mortality there. Its extension to Northumbria, and its persistence in that province, would seem to have been partly responsible for, as Bonser[11] remarks, "the decadence of Northumbria from her glorious hegemony under Edwin, Oswald, Oswy, and Ecgfrith, which followed the defeat at Nectansmere in 685." If the kingdom of Northumbria had succeeded in establishing its authority over the whole of Britain, as at one time seemed possible, the history of England would have taken a different course. For one thing, the capital of England might well have been established at either Durham or York. If the pestilence was ravaging Northumbria, however, during the decisive years from 664 to 685, there can be little doubt that its effect upon the Northumbrians must have been very serious, and it is possible that its ravages, even more than the defeat at Nectansmere, determined the decadence of Northumbria.

In order to appreciate the influence of this pestilence upon seventh century Britain, it is necessary to consider briefly the background against which it must be viewed. The last of the Roman legions left England in A.D. 409 and, with its departure, the Britons were exposed to the attacks of the Saxons and their allies from the east and south, of the Picts from the north, and of the Scots from the north and west. It is true that towards the end of the fifth century the Britons rallied under the leadership of Ambrosius Aurelianus, and inflicted defeats upon the Picts and the Scots that relieved them of any further serious threats from those peoples; but the consequent period of relative peace and prosperity that Gildas[31] describes did not last long, and with the death of Ambrosius in A.D. 537, their rally collapsed. Thereafter for some three centuries, until the completion of the Saxon conquest, they were engaged in an almost continuous and unsuccessful struggle to arrest the inward penetration of the Saxons from the east and south coasts of England. The inability of their tribes to combine for a common defence, which had previously ensured the relative ease of the Roman conquest, equally handicapped them in their struggle against the Saxons, with the result that, about the middle of the fifth century, according to Collingwood and Myres,[21] Roman Britain was divided into a number of warring states, "each dependent for its existence upon the prowess of the man at its head." Under these conditions, the civilization that Rome had introduced was destroyed. "Great numbers of places, inhabited in the Romano-British period, were deserted. Of the major towns of Roman Britain, four (Verulam, Silchester, Wroxeter, and Caistor-next-Norwich) became

uninhabited and remained so until modern times." This desertion was, however, in spite of Gildas's colourful story of ruin and massacre, apparently in most cases a peaceful one. The Britons, retreating before the Saxon advance, quietly abandoned the towns and villages that they could no longer hope to retain.

Coincident with this desertion of the urban centres, the Roman highways were neglected and became overgrown, making travel from one part of the country to another slow, difficult, and dangerous. Agriculture declined, and the woodlands and marshes encroached upon the cleared lands. Trade and industry stagnated and, in place of a free exchange of crops and manufactures throughout the country, each community tended to revert to a Neolithic state of self-sufficiency and isolation. The Saxons found a rich, settled agricultural and industrial society, inhabiting a country that was well cultivated, that provided an abundance of animal, vegetable, and industrial products, and that supported more than thirty walled towns which were connected by a network of good roads, usable throughout the year by men, horses, and wheeled vehicles.[67] Such a society would be relatively well-equipped to sustain the impact of an epidemic of disease. The comparatively high standard of living of the common people, and their obedience to a central authority, would help to lessen the ravages of an epidemic disease in the society, and it is noteworthy that we have few references to pestilences in Roman Britain.

By the time the pestilence of A.D. 664 descended upon Britain, however, little was left of that civilized state. In place of a settled and peaceful land, in which man and trade could travel in relative ease and safety from one part to another, there were tangles of woodland and marsh, interrupting the old highways and interposing between the petty kingdoms into which the country had divided. In place of thriving towns and villages, there was a dispersed and fugitive population, harassed by internecine strife, exposed to the miseries of invasion by an alien and pagan people, and deprived of all but the bare means of existence. Such a society would be ill-equipped to withstand the impact of an epidemic of disease; but the dispersal of the urban population, the difficulty and danger of travel, and the political situation, would tend to reduce the speed and extent of the spread of an epidemic disease.

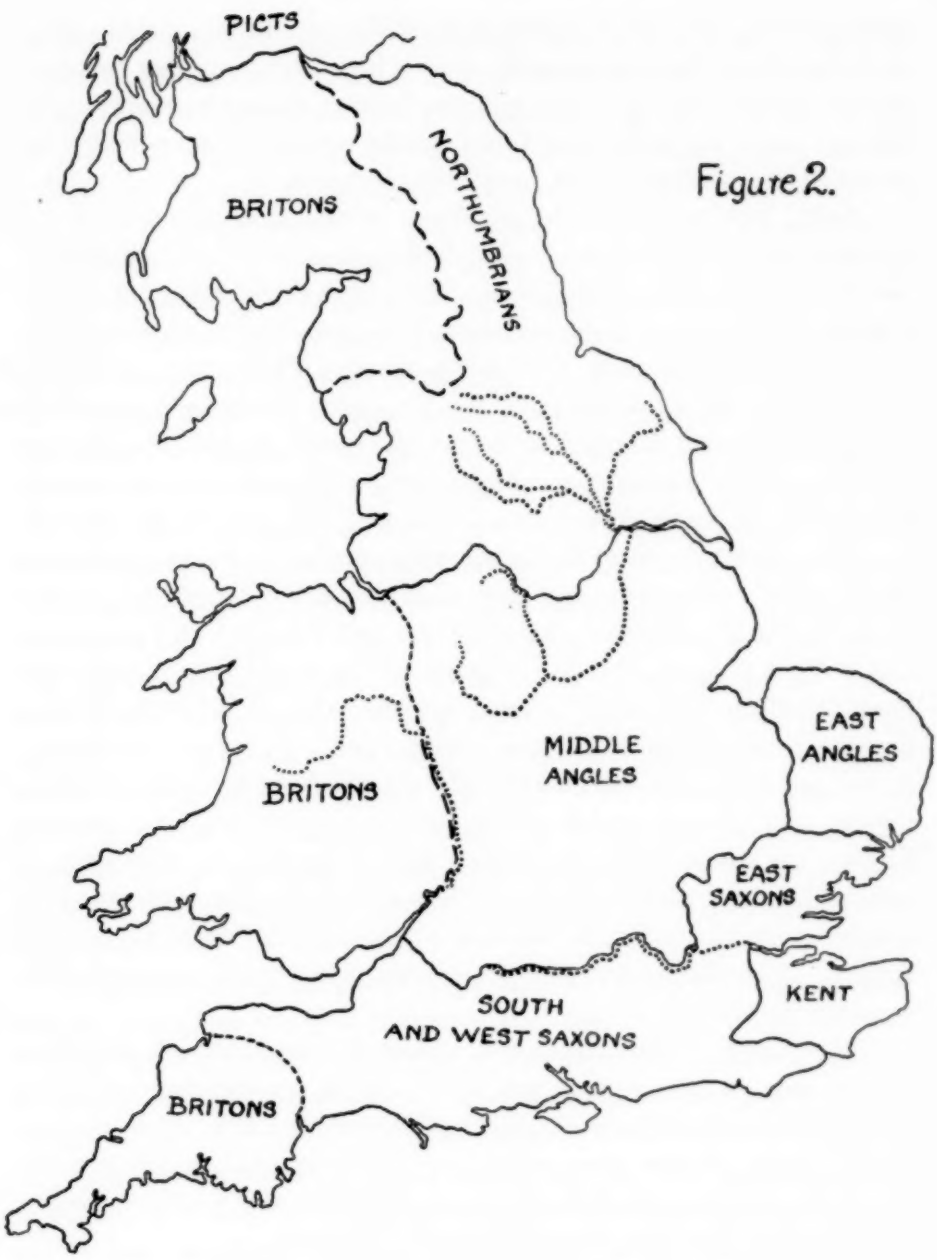
"The most important fact," says Stenton,[62] "in the history of the earliest English kingdoms is the clear distinction which was maintained for more than two centuries between the peoples established respectively north and south of the Humber. . . . As early as the year 672 the different

English peoples beyond the Humber are collectively described in a solemn record as *Nordanhymbrorum gens*—the nation of the Northumbrians. No formal document ever speaks of the Southumbrians, but the Anglian, Saxon, and Jutish peoples who lived between the Humber and the Channel are often brought together in early charters as the *Sutangli,* or southern English. . . . Until the early part of the seventh century the independent kingdom of Elmet stretched westwards for many miles from the marshes at the head of the Humber, and separated the Angles of the northern Midlands from those of the plain of York. . . . The great block of woodland which formed the mediaeval forest of Arden prevented the Middle Angles from expanding at an early date continuously across England from the Wash to the Severn. The fenland which stretched for many miles to the south and east of Crowland played an important part in early English history, for it prevented the Mercian kings from making East Anglia a Mercian province." Darby[27] suggests that England, as a whole, was much boggier and damper at this time than it is now that modern drainage and deforestation have reduced the areas of marsh and woodland. It is evident that the forest areas in seventh century England (Fig.1) must have seriously impeded free communication between north and south and, to a lesser degree, between east and west, especially as they were almost certainly the haunts of fugitive and desperate men. The political situation (Fig. 2) also militated against free and easy travel from one part of the land to another. Apart from those who had accepted service under, and been enslaved by, the Saxons and their allies, the Britons seem to have had little peaceful intercourse with the invaders, and these were engaged in their respective kingdoms in internecine strife for the hegemony of England. The Saxons do not seem to have been a gregarious folk, at any rate during their conquest of England, and they apparently chose to dwell in small, separate communities, commonly situated on the banks of rivers. Each of these settlements varied in size according to its prosperity which, in turn, probably depended upon the prowess of its elected chieftain. The impression gained from Hodgkin's[34] account of these settlements is that none of them was large and that few contained more than one hundred adults.

The spread of any communicable disease of man is governed by the nature, frequency, and duration of human contacts, and the social, political, and topographical conditions in England in A.D. 664 were such that these contacts could not have been either frequent or close. It would seem to be a reasonable presumption, therefore, that only certain diseases

Composite map, redrawn from *Anglo-Saxon England* by F. M. Stenton, and the Ordnance Survey Map of Roman Britain (2nd Ed.), to show the areas of woodland in seventh century England (stippled), the routes of the main Roman roads (solid lines), and the routes, added by the author, by which Celtic Christianity reached Britain (long dashes).

In Roman times, where the roads ran through naturally wooded country, a wide tract on either side of the road was kept cleared of trees and brushwood. The map shows clearly that these roads were either obstructed, or commanded, by areas of woodland at the time of the Yellow Plague.



Map showing the political situation in Britain in the seventh century, with the main rivers (dots), the approximate boundaries of the British and the English kingdoms (long dashes), and the boundaries of the Anglo-Saxon kingdoms (solid line).

could possibly have spread widely and rapidly over Britain in 664. They must have been diseases possessed of such high infectivity that transient contact would suffice to transmit them. Indirect contact transmission by fomites, including water and foods, would appear to be excluded by reason of the conditions that have been described.

Bede's statement that the pestilence of 664 first depopulated the southern part of Britain has led some writers to infer that it was imported into England from northern France. There is no doubt that it could have crossed the Channel because, as Levison[40] remarks: "Intercourse between Anglo-Saxon Britain and the Continent, even during the periods of invasion and the 'coalescence' of the kingdoms emerging from chaos, was probably never wholly interrupted; the waters of the Channel were a link as well as a barrier. . . . Saxon settlements succeeded not only in Britain but, on a smaller scale, also on the southern coast of the Channel. . . . Place names in use to-day in the proximity of Boulogne-sur-Mer are explained by a settlement from early Saxon Britain, and show that contact across the Straits of Dover existed in this age." Indeed, the missionary zeal of Pope Gregory I, and the intense rivalry between the Roman and the Celtic Churches for the ecclesiastical hegemony of Britain, may have been important factors in its introduction into England, and the Roman clergy and their retinues undoubtedly entered England from northern France. "Quentavic at the mouth of the Canche, near the modern Etaples, had succeeded Boulogne after Roman times as the main place of embarkation and disembarkation. The crossing by Quentavic was considered in 678 the 'via rectissima' for a man travelling from England to Rome. . . . Further to the west the estuary of the Seine attracted traffic from the Solent."[40]

There was also the slave trade, which flourished during the internecine wars in Britain, and which led to the transhipment of many English youths and maidens across the Channel for sale in the markets of France. Some of these slaves were redeemed from their slavery by noble people like Eligius and were repatriated, bringing back in all probability infections that they had contracted on the Continent.

There is, however, an alternative route by which this pestilence could have entered England. "The withdrawal of the Romans and the ensuing chaos in southeastern Britain," says Crawford,[23] were accompanied by another period of intense activity along the sea-routes of Atlantic Europe. It was by means of these routes that Celtic Britain maintained contact throughout the Dark Ages with what still survived of Roman culture

in the Mediterranean, and it was along these routes from Lerins and Marseilles across the southern France to Bordeaux and thence by sea to Ireland and Scotland that Celtic Christianity spread northwards." It was certainly the route (Fig. 3) by which the Celtic Christians of Wales and Ireland journeyed to Alexandria and Jerusalem in the sixth and seventh centuries. Marseilles was still a great seaport in the sixth century, because the western Mediterranean had not yet been closed to European shipping by the Mohammedan conquest of North Africa. Pirenne[54] states that it must have been very populous, and he draws attention to the frequency of severe epidemics of disease in the city between A.D. 566 and 591, and their extension on numerous occasions to the province of Provence. Travellers returning to Wales or Ireland from the eastern Mediterranean would inevitably be exposed to the risk of contracting these diseases.

The possibility that the English pestilence of A.D. 664 was imported either from Wales or from Ireland, instead of from France, would seem to be strengthened by Bede's statement that Ireland was as severely ravaged by it as Britain, and that many English people were in Ireland at that time. The natural reaction of these visitors, when they were confronted with the pestilence, would be to return home before they fell victims to it. They may not have brought it directly back with them from Ireland in 664, but there would seem to be a strong presumption that previous visitors had brought one back to Wales, because a pestilence with similar morbidity and mortality characters to that of the English one ravaged Wales in the latter half of the sixth and the first half of the seventh centuries.

The Britons were not a seafaring folk and their only sailing craft, the coracle, was ill-adapted for voyages out of sight of land. The shortest crossing between Ireland and Britain is the passage from Wexford Bay to St. Bride's Bay, and situated on the north shore of this bay in the seventh century was the cathedral and monastery of St. David's, one of the oldest and most famous centres of Celtic Christianity and learning in the west of Britain, and the obvious place of call for travellers between Ireland and Britain. Higden,[33] writing about Ireland in the first half of the fourteenth century, says that it "hath on the southe este to hit Spayne by the sailenge of thre dayes from hit as colaterally, and on the este to hit the more Briteyne beenge from hit by the saylenge of oon day. . . ." When Higden compiled his chronicle, the speed and size of seagoing vessels had been greatly improved by comparison with seventh century ships, and the times that he gives for the passages from Ireland to Spain, and

from Ireland to Wales, are much faster than they could possibly have been in 664. When St. Patrick crossed from Ireland to Wales in the fifth century, the passage took three days, so it is a reasonable presumption that in the seventh century that passage would occupy from two to three days,

Figure 3.

Map showing the routes by which Celtic Christianity (long dashes), and Roman Christianity (dots), travelled from the Near East and Rome to the British Isles in the sixth and seventh centuries, and the trade zone of Anglo-Saxon England (short dashes).

It is of interest to note that trade probably played no part in the importation of the Yellow Plague into England, because in later times trade and war have been the two forces chiefly responsible for the dissemination of epidemic diseases. In the first centuries of the Christian and Mohammedan eras, however, religious zeal appears to have been the chief dispersal force.

depending upon the conditions of wind and tide, which runs strongly through St. George's Channel. The passage from Ireland to Spain, and vice versa, would certainly occupy from four to six days in the seventh century, depending upon the state of the wind and of the tide. These times are of importance, in contrast to the short passage across the English Channel, in connection with the incubation periods of the diseases that could have been the pestilence of A.D. 664. Any one of these diseases could have been imported into England across the Straits of Dover, but only certain of them could have been brought into the country by way of Ireland and Wales, and the important fact about the pestilence of 664 is that, however and whenever it reached the British Isles, it had first to cross the sea.

From St. David's, the natural route of travellers from Ireland to England in the seventh century was along the south coast of Wales to the monastery of Llandaff, and then by boat across the Bristol Channel, either to the estuary of the Parrot, from which it was an easy journey overland to Glastonbury, or to some haven farther west along the north coast of Devon. From the monastic centre of Glastonbury, relatively easy pathways radiated westwards to the vale of Taunton, southwards to the Dorset uplands, eastwards over Salisbury Plain, and northwards through Cheddar Gorge to the east bank of the Severn. A pestilence in Wales could have spread into England by other routes, but the one described would seem to be the most likely one in the seventh century because the River Severn, at any rate south of Worcester, was a formidable barrier between south Wales and England in those days, and land travel must have been difficult among the valleys of Monmouth and Glamorgan.

If the argument that a pestilence could have spread from Ireland through Wales to England by the route described is accepted, it follows that the same pestilence must have afflicted each of those countries, though the visitations may not have been synchronous. The rate of spread of any communicable disease of man is determined by the speed of human travel, and travel was slow in the sixth and seventh centuries, especially across the ocean. A disease of high infectivity might spread rapidly overland, but its spread across the sea might be arrested until human carriers developed. A disease of this nature erupting in a virgin population often exhibits a high case mortality rate, and human carriers do not usually appear until its initial virulence is reduced and a balance has been struck between the host species and the parasite. It would seem to be a reasonable presumption, therefore, that if pestilences called Yellow Plagues

occurred in Ireland and Wales prior to A.D. 664, the English pestilence of that date may well have been of the same nature.

As Wales must have been attacked before England by a pestilence spreading from Ireland by the route described, the Welsh records will be discussed before the Irish are examined. Unfortunately, although there appears to be some authentic material in the Welsh records, there is also much legendary material and some deliberate forgery. I have been informed, for example, by a mediaeval historian who, I regret, desires to be nameless, that the Iolo Manuscripts are a late eighteenth century forgery by Iolo Morgaunwy, and there are possibly other Welsh forgeries about which I am ignorant. Only a trained historian, who possesses a mastery of the Welsh language, can distinguish between the authentic and the worthless in these records, and I do not know of any historical work in which that analysis has been made. I am therefore obliged to accept the records as I find them, and to quote them with the proviso that they may or may not be authentic.

It is a pity that Morgaunwy chose forgery as a means of achieving literary notoriety, because his act brings all the old Welsh records under suspicion. He was responsible, it seems, for the *Triads of the Isle of Britain,*[68] of which No. 12, if it were authentic, would probably rank as one of the earliest references to a pestilence with a claim to be called the Yellow Plague in Wales. Although this triad is a forgery, it is worth quoting for its verisimilitude. It reads: "Three dire plagues of the isle of Britain: The first, a plague from the carcases of the Irish killed in Manuba, after they had enthralled for nine and twenty years the land of Gwynedd. The second the plague of the Yellow fever of Rôs and that too was from the corpses of the slain, so that if anyone came in the wind from off them he fell straightway dead. The third was the plague of the putrid sweat caused by a rotting of the corn through dampness in the time of the Norman thrall under William the Bastard."

An early traditional reference to the second of these plagues occurs in *The Mabinogion,*[43] the original of which was *The Red Book of Hergest,* a fourteenth century manuscript, which is itself a compilation of much older records and traditions. In *The Mabinogion,* however, the plague corresponding to the Yellow fever of Rôs of the Triads is stylised as a "shriek, which came on every May-eve, over every hearth in the Island of Britain." This reference may also be a forgery, because its similarity to the biblical description of the plague of Egypt in which the Angel of the Lord smote the firstborn is obvious.

The earliest authentic reference to a pestilence in Wales in the sixth century would seem to be the entry in the *Annales Cambriae*,[8] under the date of A.D. 547, which reads: "Mortalitas magna fuit in Britannia in qua pausat Mailcun rex Genedotae." This record says nothing about a Yellow Plague, but it was compiled by a monkish chronicler who, like Bede, may not have been interested in recording popular designations. There is also apparently considerable doubt among historians about the accuracy of his chronology. The death of Maelgwn was an event that had important consequences for the Britons, however, because he was one of the last of their strong leaders during the time of the Saxon conquest, and it is presumable therefore that the Welsh chroniclers told the truth when they stated that "he died of the *vad velen*, or yellow plague, in the church of Llanrhos,"[71] whither he had fled to seek sanctuary from it. His death, and the Yellow Plague, had been foretold, so it is said, by the Welsh bard, Taliesin, who had been dispossessed of his property in Arvon by Maelgwn, "for which he pronounced his curse on Maelgwn, and all his possessions: whereupon the Vad Velen came to Rhos; and whoever witnessed it, became doomed to certain death. Maelgwn saw the Vad Velen, through the keyhole, in Rhos Church, and died in consequence."[37] Williams, the translator of the Iolo Manuscripts, who was apparently unaware that they were forgeries, adds the note that "the 'Vad Velen' or Yellow Putridity, appears to have been a severe pestilence that visited this Island, at different periods in its early history. It is personified in this legendary reference to Maelgwn."

The Life of St. Teilo, in the Book of Llandaff,[42] contains a much more elaborate reference, which is of importance—if there is any truth in it—because of the hints it contains about the nature and extent of this pestilence. "St. Teilo received the pastoral care of the Church of Llandaff" —in A.D. 512, according to Bonser[11]— "in which however he could not long remain, on account of the pestilence which nearly destroyed the whole nation. It was called the Yellow Pestilence, because it occasioned all persons who were seized by it to be yellow and without blood, and it appeared to men as a column of a watery cloud, having one end trailing along the ground, and the other above, proceeding in the air, and passing through the whole country like a shower going through the bottom of the valleys. Whatever living creatures it touched with its pestiferous blast, either immediately died, or sickened for death. If anyone endeavoured to apply a remedy to the sick person, not only had the medicine no effect, but the dreadful disorder brought the phy-

sician, together with the sick person, to death. For it seized Maelgwn, King of North Wales, and destroyed his country; and so greatly did the aforesaid destruction rage throughout that nation, that it caused the country to be nearly deserted."

The translator, Rees, adds the note that "the British Poets personified disease; and this, in the form of a woman, was to slay Maelgwn, if he looked upon it, which he incautiously did through a window." Williams[71] states that Taliesin's prophetic words, translated into English, are: "A strange creature will come from the marsh of Rhianedd, to punish the crimes of Maelgwn Gwynedd; its hair, its teeth, and its eyes are yellow, and this will destroy Maelgwn Gwynedd." Rees,[42] who supplies an identical translation, adds in a footnote to his Life of St. Teilo, that it is a reasonable inference that the Book of Llandaff was compiled in A.D. 1132, by Urban, Bishop of Llandaff, from an older Register of Teilo. Maelgwn, he says, died some time after A.D. 552, because in that year he endowed the See of Bangor with lands and privileges. If this is correct, the chronology of the *Annales Cambriae* is at fault by at least five years, and the chronicler who was so careless about an important date was not likely to be more careful about naming the pestilence.

It seems doubtful, however, whether any of these records are authentic, because my informant about the Iolo forgery states that the Taliesin 'prophecy' is a later concoction than the Life of St. Teilo, which is of mid-twelfth century date and contains much legendary matter, and that the 'prophecy' is valueless as evidence. It is disconcerting, in view of this authoritative statement, to find Lloyd[41] using the story of Taliesin apparently as though it were authentic. He says that an "ancient proverb suggests that he [Maelgwn] died at Deganwy, but a more picturesque account says that, when the Yellow Plague was roaming through the land in the guise of a loathly monster, he took refuge from it in a church not far from his court. 'And Maelgwn Gwynedd beheld the Yellow Plague through the keyhole in the church door and forthwith died.' As to what it looked like, *authorities are not agreed;* in the Story of Taliesin, it is described as a strange beast, with yellow eyes, teeth, and hair; but in the life of St. Teilo contained in the Liber Landavensis it is a column of vapour rising from earth to heaven. . . ." The italics are mine. As Lloyd is an accepted authority, there is presumably a reasonable case that the Welsh pestilence was known as the "Yellow Plague" in the sixth century.

Bonser,[11] who has carefully collected an exhaustive list of references

to this pestilence, states that large numbers of Britons fled to Armorica (Brittany) and remained there during the years of its prevalence, and he adds: "One gathers from the evidence in the *Liber Landavensis* that they found many of their churches desolate on their return to Gwent, and many monasteries in consequence of this were not reoccupied." He also mentions the reference by Wirt Sykes in his book, *British Goblins,* to the " 'marw-coel, or yellow-spot before death' as a death omen," and adds that, although he can find no details of this, its connexion with the Yellow Plague would seem to be obvious.

In the Life of St. Ouduceus, which is also included in the Book of Llandaff, there is the statement that "after a very long time, the Yellow Pestilence came to Greater Britain, which was called Yellow, because it occasioned all persons who were seized by it, to be yellow and very pallid. . . ."

Assuming that the Life of St. Ouduceus is not wholly fictitious, a reasonable deduction from the record of the pestilence contained in it is that it had been prevalent for many years in Lesser Britain before it spread to Greater Britain. If the writer meant to include England and Wales in his "Greater Britain," then the implied Lesser Britain must be either Brittany or Ireland; but this interpretation is improbable because the Britons who fled to Brittany—and their flight appears to be authentic—escaped the pestilence, which obviously was not present therefore in that country at that time. Moreover, Ireland was recognized as a distinct country from Britain from very early times; it was known to the Greek geographers as Ierne, and to the Romans as Hibernia. The conclusion that may reasonably be drawn from this passage would seem to be, therefore, that the pestilence ravaged Wales for many years before it spread to England. The slowness of its spread may have been due to the paucity of the communications and the absence of peaceful intercourse between the two countries, and to the sparsity of the population in the disputed territory that separated the Anglo-Saxons from the Britons.

Writing five centuries later, when communications between England and Wales had presumably improved, Gerald de Barry[8] depicts the difficulty of travel between the two countries. "A journey for four Welsh clergymen from St. David's to Westminster, in the depth of winter," he says, "was no ordinary achievement in the twelfth century. I say nothing of the expense and inconvenience, or their little acquaintance with the language and manners of the country through which they had

to pass. Inns and conveyances there were none; the roads apparently had never been repaired from the days of the Romans in the more neglected districts of the west. The confusions on the borders had filled them with thieves and vagabonds, to whom Welsh and English were alike lawful plunder. . . . The voyage by sea in stormy weather, and the undignified horrors of a fishing smack, were the least part of the convenience."

There is a late reference that must be included here, because it is concerned with the effect of the pestilence in South Wales and, especially, because of the writer's connotation of the Yellow Plague with jaundice. Gerald de Barry,[8a] explaining the arrival in Brittany of Archbishop Sampson's episcopal cloak, says that during Sampson's tenure of office of the See of St. David's, "a plague which they called the Yellow Plague, which the physicians also name jaundice, was raging throughout Wales, by which the people fell in droves. The president, [Sampson] though saintly and fearless in the face of death, at the urgent entreaty of his friends, took ship A.D. 534, when a west-northwest wind was blowing, and with his friends preserved himself unharmed in Brittany." De Barry was born in A.D. 1147, and he wrote his account of the Welsh Church sometime between A.D. 1180 and 1190, by which time the Yellow Plague was ancient history. As he gives no older authority for calling the pestilence the Yellow Plague, some critics may argue that there is no ground for accepting his designation; but as he was some nine centuries closer to the Welsh pestilence than we are, it is possible that he had access to authentic information about it that we do not possess.

The Welsh records, for what they are worth, indicate that the Yellow Plague was so highly infectious that no one could approach a sick person without acquiring the infection, and the story about Maelgwn's death, if there is any truth in it, indicates that actual bodily contact was not necessary for its spread from one person to another, but that infection could be transmitted by 'droplet' spread over a considerable distance. There are certain diseases that possess this degree of infectivity, and if Maelgwn only conversed with a person in the infective stage of one of them from a window in Llanrhos Church, that contact could have sufficed to transmit the infection. If the story of his acquisition of the Yellow Plague is fictitious, it is good fiction because it could be true.

The Welsh records also leave no doubt about the malignity of the pestilence. It spared neither high nor low; it decimated the Britons, and it drove many of them to take refuge from it overseas. Although it

has received scant attention from Anglo-Saxon historians, it would seem nevertheless to have played an important, perhaps a decisive, part in the failure of the Britons to stem the Saxon invasion. They needed all their man-power and their fortitude to oppose a successful resistance to that invasion, and the deadly and dispiriting effect of the pestilence must have greatly reduced both their ability and their will to resist. It is possibly not just a coincidence that after the pestilence had apparently exhausted itself in Wales, and had passed over its borders, the Saxons made little further progress westwards and never succeeded in subjugating Wales. This opinion is, of course, based upon the assumption that there was a pestilence in Wales which spread to England in A.D. 664. Historians appear to accept the record in the *Annales Cambriae* as authentic, and there seems to be a general agreement that there was a pestilence in England in A.D. 664. What some of them are not willing to concede, however, is that those pestilences were known as the Yellow Plague by the peoples who suffered from them although, as the Welsh pestilence has repeatedly been referred to as the *Vad Velen* by Welsh scholars and translators, some of whom were acknowledged authorities in their day, it presumably had some title to that appellation. For the purpose of my argument, therefore, I shall assume that both the Welsh and the English pestilences were called the Yellow Plague and, in the light of that assumption, proceed to examine the nature of the pestilence.

The different annals that provide the Irish references to pestilences, commonly known as yellow plagues, were mostly compiled in their present form during the sixteenth century from old Irish manuscripts in the possession of the religious houses, or in the private collections of Irish notables. It is certain that errors were made in translating and transcribing them, but I am not aware that any of them are deliberate forgeries like the Iolo Manuscripts. The informant, to whom I have already referred, says of these Annals, in a personal communication: "Before one can take the annals as decisive, one would need to know their interrelations, and to have some idea whether or not they are reasonably contemporary in form." This is sound advice for the student of Irish history who possesses a mastery of the Irish language; but it is not practicable for the medical man who is not a trained historian, and who lacks the necessary language qualification. I shall therefore assume that their references to the "buidhe-connaill," the "Stubble-Yellow Plague," are authentic, an assumption which certainly seems to have been shared by many Irish scholars and translators.

One of the earliest of these references occurs in the "Life of St. Mochua of Balla"—who died in A.D. 637—which is included by Colgan*[20] in his *Acta Sanctorum*. Stokes[63] renders the story thus: "Sil Muredaig an Irish sept was suffering from the Yellow Plague, and the clerics of the province of Connaught sought to banish it from them, and they succeeded not. So they came to the place where Mochua was dwelling, and he healed them, and put the colour which was on them upon his crozier. . . ."

The Lismore Life of St. Mochua (Knott[39]) says: "The Sil Muredaig was in the *Buidechair*, . . ." which Stokes has rendered, perhaps too freely, "the Yellow Plague." In the ancient "Life of St. Gerald of Mayo," also published by Colgan,[20] the extraordinary story is told that the rulers of Ireland, Diarmaid and Blathmac, decided to pray that the excessive population of the lower ranks of the Irish people, whose numbers could not be supported on the available home-grown food supplies, should be reduced by means of a pestilence. In spite of Gerald's opposition, the proposal was approved, whereupon an angel appeared with the warning that the two kings should perish by the pestilence, called in Irish the *"budhe Connaill."*** To this account, Colgan adds the following note: "De viris sanctis, Regibus, multisque aliis hac mortalitare extinctis; ita scribunt Quatuor Magistri in Annalibus ad annum 664: Ingens hoc ano fuit in Hibernia mortalitas, quae Buidhe Chonnaill (i. flava ictericia, sive Icteriacides) vulgo appellatur, . . ."

We come now to the references in the Irish Annals, which I have arranged in alphabetical order for convenience.

Annals of Clonmacnoise[4]

A.D. 550. The prophet Bey McDe began to prophesie. . . . there should come Great mortality of men, which would begin to ffanid in Ulster, called the *sweep* of Fanaid. The Great Pestilence called the Boy Connell began. . . .

A.D. 552. This year grew a sickness called the Sawthrust.

A.D. 569. Diseases of the Leaprosie did abound and knobbes this year.

A.D. 664. There was a great mortality through the whole kingdom which began in Moyith the first of August this yeare. . . . [Here follows a list of prominent

* "Ictericia, vel aurigine, id est, abundantia flavae bilis, per corpus effusae, hominemque; pallidum reddentis, Muregidarum gens laborabat. Qui totius Iberniae medicis consultis nullo medicamine sanari potuerunt: rebus humanis diffisi Mochuae patrocinio Dei fidem implorare constituunt. Duo millia & quingenti aurignati Ballam conveniunt: ubi Mochuae precibus, atque consecratione curantur, suum quisque; colorem recuperantes, pallore in Sancti viri baculum transeunte: . . ."

** . . . una cum Rege Ultoniae, & Rege Momoniae, & cum multis aliis per infirmitatem quae Icteritia vocatur occidit: haec enim infirmitas in hibernico decitur budhe Connaill. Haec enim pestilentia mortui sunt tot homines, quod non remansit, tertia pars populi."

persons who died from the pestilence.] —together with many other princes, bishops, and abbots who died of the said pestilence.

A.D. 675 There Raigned a kind of Great Leprosie in Ireland this yeare, called the pox, in Irish bolgach.

The Annals in Cotton MS.,[5] incorrectly known as the "Annals of Boyle."

A.D. 534. A great mortality; that is, the Buidhe Chonnaill.

Wilde[17] remarks that "this is the earliest date assigned to the first outbreak of the great yellow plague in the midst of the sixth century."

A.D. 665. Mortalitas magna, namely the Stubble-Yellow [Plague]. Diarmait and Blathmac, the two kings of Ireland mortui sunt. . . . of the Stubble-Yellow Plague.

Annals of the Four Masters[6]

A.D. 543. The fifth year of Diarmaid. There was an extraordinary universal plague through the world, which swept away the noblest third of the human race.

O'Donovan adds in a footnote that "this plague, which was called by the Irish *Blefed*, is entered in the *Annals of Ulster* under the year 544, and in the *Annals of Clonmacnoise* under 546. In most chronological tables it is noticed under the year 543, as having passed from Africa into Europe."

A.D. 548. The tenth year of Diarmaid. . . . Of the mortality which was called the Cron-Chonnaill,—and that was the first Buidhe-Chonaill,—these saints died. . . . [Here follows a list of the names of the victims.]

A.D. 664. A great mortality prevailed in Ireland this year, which was called the Buidhe Connail.

Annals of Ulster[7]

A.D. 544. The first mortality, which is called "blefed."

A.D. 548. Great mortality. [From which several prominent persons, whose names are given, died.]

A.D. 553. The distemper (*i.e.*, leprosy), which is called the Samthrosc.

Hennessy adds the note that "in the Cambridge Codex Canon. Hibern. (p. 134) *trusci* is glossed with 'scabiem'; which would prove, without the gloss *lepra* in the entry that the 'Samthrusc' was a cutaneous disease."

A.D. 555. A great mortality in this year, *i.e.*, the *cron-conaill, i.e.*, the *buidhe-conaill.*

In an explanatory note, Hennessy states that *cron* means "saffron-colour," and *buidhe* means "yellow." "The second member of the name, *conall,*" he says, "is evidently the same kind of disease which proved so fatal in 544."

A.D. 575. A spark of leprosy. . . .

A.D. 663. A pestilence reached Ireland on the Kalends of August. . . . The mortality raged at first in Ireland in Magh Itho of Fothart.

Hennessy remarks that "the plague, or leprosy, called Samthrosc, mentioned at the year 553, is probably referred to in this entry."

A.D. 664. A great mortality (*i.e.*, the "Buidhe-chonail)."

A.D. 666. A mortality in Ireland.

A.D. 667. A great mortality, *i.e.,* the Buidhe-chonaill."

A.D. 679. A most severe leprosy in Ireland, which is called "bolgach."

Chronicon Scotorum[18]

A.D. 551. A great mortality, *i.e.,* the Crom Conaill. . . .

A.D. 661. A great mortality in Hibernia, viz., the Buidhe Conaill.

A.D. 676. A very severe leprosy, which is called "bolgach."

Wilde[17] provides three more references that are of importance. Under the date of A.D. 656, he states that there is an entry on the margin of the Dublin copy of the *Annals of Clonmacnoise,* which reads: "Mortality reigned in England about this time, insomuch that King Cadwallader, and the few Britons who were left alive, departed from thence, and left the kingdom desolate and waste for the Saxons." This entry is confirmed by Polydore Vergil,[69] who made very few mistakes in his history according to his editor. After stating that Cadwallader had fallen ill, and that civil war had broken out in consequence among the nobles who were contending for the prospective vacant throne, Polydore continues, "wherebie it camme to passe that in a littel time a greate famine arose, and another evell more daungerus then that, for the pestilence, which is coosin germaine to famine, did in suche wise accompanie the same, that the live cowlde not burie the deadd, insomutche that the carkas of the dead lay in the sighte of men, which all way looked for the like deathe, soe that the dead made others sicke, the sicke infected the whole bothe with disease and feare."

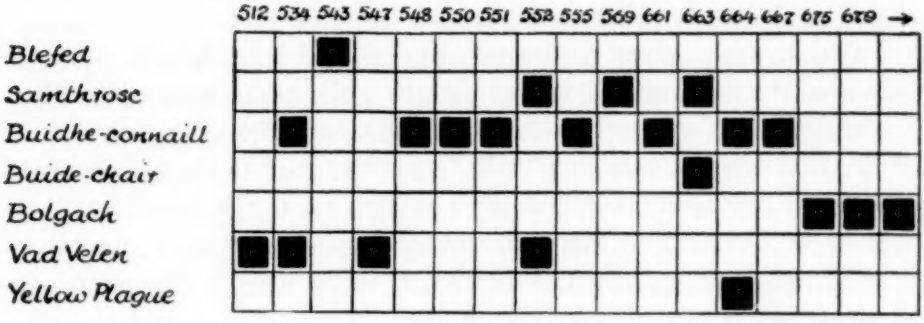
Wilde's second reference is dated A.D. 661. "St. Colman, who died, according to the Four Masters, in 661, composed a hymn to protect himself and his disciples from the Buidhe-chair." His third reference is a quotation from the Book of Leinster, under the date A.D. 663: "Diarmaid and Fair Blathmac reigned twenty-five years, till they were killed by 'the yellow-skin distemper.'"

After allowance has been made for probable errors in chronology, the fact remains that the Irish records appear to establish that a devastating pestilence, with a very high mortality rate, broke out in Ireland about the middle of the sixth century, either shortly after, or almost synchronously with, the eruption of the Vad Velen in Wales. (Table I) This pestilence was presumably a new one to the Irish because they called it *blefed,* a word that is apparently not of Irish origin, and one that none of the authorities I have consulted has attempted to translate, although Hennessy seems to gloss it with *conall,* and the suggestion has been made that it may be an Irish transliteration of the Welsh word *"cleved,"* meaning "sickness." The table shows that the common denominator of the diseases listed by the Irish annalists is the disease which they called the "buidhe-connaill," and it is a reasonable presumption that the different names therefore represent different stages in the clinical manifestations of the one disease, or the attempts of different observers

to describe a disease which had hitherto been unfamiliar to them. The term "leprosy" in the Annals is, of course, used in its original Greek sense to mean any scabby, scaly, or crusted disorder of the skin.

At first sight the Irish names would appear to indicate that Ireland was afflicted by a succession of severe epidemics of different diseases, and it is probable that more than one disease was epidemic in that country

Table 1.



between A.D. 534 and A.D. 679. The different terminology does not prove, however, that the *blefed,* the *samthrosc,* the *buidhe-connaill,* the *buidhe-chair,* and the *bolgach,* were distinct diseases. When a transmissible disease is introduced to a virgin population, it erupts with a violence and a malignity that are extraordinary, and its clinical picture may be different from the one that it exhibits after it has settled down as an endemic disease. The evolution of the host-parasite relationship is accompanied by alterations in the manifestations of the disease, but the evolutionary trend is always towards a relatively stable relationship, with a relatively constant clinical picture, because the death of the host usually entails the death also of the parasite, and the extermination of the host species is a biological disaster for the parasite. When a transmissible disease first erupts in a virgin population, it may kill the bulk of those it attacks with extraordinary rapidity and with the minimum of objective signs of its presence. At its next eruption, it may not be quite so deadly because there has already been one contact, and therefore a beginning of adaptation, between host and parasite; but the picture that it exhibits may still be an extreme and unusual one. With each successive outbreak,

however, an increasing tolerance develops between host and parasite, although the degree of tolerance is always a relative one. The usual result is that the disease progressively becomes less deadly, less rapid in its progress in the individual case, and more stable in its clinical manifestations, until finally it settles down in the population as an endemic disease with well-marked and relatively constant manifestations. In ancient times it is practically certain that, during this progress of adaptation, the different stages marked by successive outbreaks would be given different names. I submit, therefore, that the names recorded in the Irish Annals most probably depict the stages in the acclimatization of the same pestilence after its introduction to a virgin society.

Of the names given to this pestilence in the Irish Annals, the one that is of the most immediate significance is the name *cron-* or ***buidhe-connaill.*** Knott[39] suggests that *connaill* may be a descriptive derivative of the Irish *connall,* meaning "stalk," "stubble," said to be derived from *cannula,* a small, low reed. She gives a reference to this pestilence in a Life of St. Declan in a fifteenth century manuscript, which states that it first made men yellow and afterwards killed them.* This sequence is important because it rules out the possibility that the pigmentation was a coloration that developed after death. Wilde[17] states that buidhe-connaill means, literally, the corn or stubble-coloured yellowness, and then suggests that it was "probably a form of yellow fever, or the bilious remittent, still observed in the West Indies and America." When Wilde made this suggestion, however, the aetiology of yellow fever was unknown. Other authorities interpret buidhe-connaill similarly, and it may therefore be accepted that the distinctive feature of this pestilence was a peculiar yellowish coloration of the surface of the body that its victims exhibited before their deaths.

The Irish records, like the Welsh, leave no doubt about the malignity of this pestilence. No rank, class, age, or sex was exempt from it, and in its successive eruptions it destroyed a considerable proportion, possibly as much as one half, of the population of Ireland. The effect of this pestilence upon subsequent Irish history provides an interesting historical speculation, because Ireland had barely recovered from its ravages when the Viking attacks began. Its immediate effect would seem to have been that it robbed Ireland of its position as the repository of European culture and learning, partly by its slaughter of the monastic orders, which

* Eodem tempore dira pestis venit in Mumenia, sed venenosior erat in civitate Caissel Cushel quam in ceteris locis; que flavus primitus faciebat homines et postea occidebat.

suffered as severely as the rest of the Irish society, and partly by inhibiting the immigration of scholars and students from the Continent.

The epithet, "yellow," applied to this pestilence can be interpreted in one of three ways. It could have a mystical meaning, expressive of the intense malignity of the pestilence, just as the pandemic of bubonic plague in the fourteenth century later received the appellation of the "Black Death." It could signify, as Colgan inferred, that the disease was accompanied by jaundice. It could be an attempt on the part of an early civilization to describe a hitherto unknown coloration of the surface of the body, due to some cause other than the deposition of bile pigment in the skin, with the appearance of which the medical section, at least, of that society was familiar because it was conversant with the ancient medical works of the Mediterranean civilizations, in which jaundice was frequently and accurately described. "Ancient Irish medicine," says Garrison,[30] "has many signs of Oriental provenance, particularly in the austere regulations of medical practice and quackery in the Brehon Laws, which suggest the Code of Hammurabi."

The first interpretation can only be upheld if there is evidence that the colour, yellow, had a special significance among the Irish and the Britons in relation to the act, or state, of death. There is no such evidence obtainable from Irish sources, and Knott[39] affirms that she does not know of any evidence for the use of "yellow" as a "death colour" in Ireland. On the contrary, although "it is used of a sallow complexion, in literature it is usually a cheerful colour, applied to hair, gold, buttercups, the world. The 'death colour' is usually *bán,* 'white.' " In connexion with the use of colours in sacerdotal vestments, Stokes[64] states that the "Lebar Brecc" mentions eight colours and gives the mystical meaning of each. Of the colour yellow, it says: "Now this is what the Yellow denotes, when the priest looks at it, to wit, that the earth, which is the material of his body, is clay and ashes; and that it will go again to that same ashes; wherefore, then, a step of arrogance should never visit the priest." The other colours mentioned are blue, white, green—which signifies the burial under the mould when life is ended—brown, red, black, and purple. If the epithet applied to this pestilence had been intended to have a mystical significance, it seems probable that the colour selected would have been either white or green. I have not been able to obtain any information about the mystical meanings of the different colours from Welsh sources, but there is no reason to suppose that they would have differed materially from the Irish meanings.

Most of the writers who have discussed the nature of the Yellow Plague seem to have accepted Colgan's gloss of *cron-chonnaill,* and to regard it as a disease in which jaundice was a prominent feature. Colgan did not publish his *Acta Sanctorum,* however, until A.D. 1647, and he quotes no older authority in support of his gloss; but he must have been familiar with the works of Gerald de Barry, and there is therefore a possibility that the authority which he accepted for his gloss was the passage that I have already quoted from de Barry. There is no doubt, as I have already intimated, that the Irish medical ollams of the sixth and seventh centuries, and their British equivalents, were familiar with jaundice. Each of the three Anglo-Saxon Leech Books[19] contains remedies for jaundice, and though those books were not compiled until the first half of the tenth century, most of the recipes they list had been in use for several centuries. Recipes for the treatment of jaundice occur also in the compilation of *The Physicians of Myddvai,*[50] and many of these date back to the time of Howel Dda, who was a conspicuous king in South Wales in the first half of the tenth century. It is presumable that some of these remedies for jaundice were in common use in his time. There is other evidence from the old Welsh and Irish records that jaundice was well known as early as the sixth century, and one would expect, therefore, that if jaundice had been responsible for the coloration of the skin in the Yellow Plague, some clear indication of that fact would have been incorporated in the appellation given to that pestilence.

Nevertheless, the possibility that the disease was one with which jaundice was a common concomitant must be considered, if only because Knott[39] states that "a synonym for buidhe-connaill in some early manuscripts (for example, the T.C.D. *Liber Hymnorum,* which is probably of twelfth century date) is *buidechair,* which is later used of 'jaundice'; it renders *morbus regius* in an early modern Irish version of the Aphorisms of Hippocrates. In the twelfth century Book of Leinster, *buidechair* is mentioned in an invocation along with *bolgach,* but the context does not give any notion of the diseases meant."

French[29] states that the acute fevers and infections that are, or may be, accompanied by jaundice are malaria, typhus fever, typhoid fever, pyaemia, influenza of the septic type, pneumonia, Weil's disease, epidemic catarrhal jaundice, yellow fever, and relapsing fever. In malaria, jaundice only occurs inconstantly, and to a slight degree, in chronic cases. In typhus fever its occurrence is only occasional, and in typhoid fever it is rare. In pyaemia it often occurs as a late symptom; but pyaemia is a

terminal phenomenon of some septicaemic infections with certain pyogenic bacteria, and I know of no record in medical literature of an epidemic of pyaemia. In pneumonia it occasionally occurs as a complication. A severe degree of jaundice may attend Weil's disease, but it is not a constant feature of the disease. This disease, however, depends upon the close association of man and the rat under peculiar circumstances, and there is no evidence that the black rat existed in the British Isles in the seventh century, while we have certain knowledge that the grey rat did not reach these islands until the eighteenth century. There is no word for rat either in early Saxon or in ancient Irish. Murray[49] states that "the ultimate origin of the word is uncertain, but it seems probable that it was adopted first in the Teutonic languages when the animal came to be known in Western Europe, and thence passed into the Romance tongues. C. 1,000 Ælfric Gloss in Wr.-Wulcken 118/41 Fiber . . . befer. Raturus, raet, Lutria, otor." Ælfric's Anglo-Saxon vocabulary of A.D. 1000, or thereabouts, therefore contains the first mention of the name "rat." Baxter and Johnson[9] mention "mus peregrinus" as a name in use about A.D. 1123, and remark that "peregrinus" suggests that the animal was of foreign origin and that it had an association with ships, an association that the black rat has retained to this day. If there is no word in a language for a particular animal, it is presumable that that animal was unknown, either from direct observation or from hearsay, to the society using that language. The absence of the black rat from the British Isles, until at least the tenth century, is also supported by the fact that the first indubitable references to it are to be found in the works of Gerald de Barry, which were not written before A.D. 1180.* When the black rat did reach Ireland, sometime probably in the tenth century, it was called *luch Frangcach,* the French mouse, which clearly indicates that the Irish recognized it as a recent importation.

Cullinan,[26] writing about epidemic catarrhal jaundice, states that "the spread of the infection is invariably by close contact. Water, milk, and food play no part. Infectivity is only high when contact is close, for example in schools. . . . The jaundice may be so fleeting that it is not diagnosed." Although a transmissible disease may wax or wane in virulence, the biological factors that govern the spread of the causal agent

* *Distinctio Secundo, De Mirabilibus Hiberniae et Miraculi,* ch. 32.

Est in Lagenia provencia quaedam Ferneginam dicitur, quam a Weisefordia solum Slanensis aqua disterminat. Unde *mures majores,* qui vulgariter *Rati* vocantur, per imprecationem sancti Yvori episcopi, cujus forte libros corroserant, prorsus expulsi, nec ibi postea, nasci, nec vivere volent invecti. See also *Itinerarium Kambriae,* Bk. 2, ch. 2.

from host to host do not change with the passage of the centuries. Opportunities for close contact outside the family were few in seventh century Britain, and probably not frequent in seventh century Ireland outside the monastic houses. The population of Roman Britain, according to Darby,[27] was less than one million. It was probably little larger in A.D. 664, but even if it had doubled itself by that date, the density of population would only have been 3.8 persons per square mile, and there were no large urban aggregates to provide reservoirs of the disease. Epidemic catarrhal jaundice can therefore be eliminated from the list of suspect diseases.

Yellow fever can only be communicated to man by the bite of a mosquito, and only certain species can act as the essential biological vector. Although one species, *Aedes geniculatus,* which has been collected in all parts of Britain in every month of the year, can carry yellow fever,[45] there is unassailable evidence that the causal agent can only complete its life cycle in its insect host under tropical conditions of temperature and humidity. Although yellow fever was brought into the port of Swansea in 1878, it did not spread beyond the immediate vicinity of the harbour. The climate of the British Isles in the sixth and seventh centuries was, if anything, colder and wetter on the average than it is today; it was certainly not tropical, or even subtropical. Moreover, when yellow fever was first encountered by Europeans in the sixteenth century, it was called "El vomito negro," "the black vomit," because that symptom arrested their attention even more than the accompanying jaundice. It is probable that if the ancient Irish had ever encountered yellow fever, they also would have given it a name that had reference to this symptom. Yellow fever can therefore be dismissed from the list of suspect diseases.

Of the diseases listed by French, relapsing fever is the one that has the strongest claim to be the disease of the Yellow Plague, especially as Macarthur[44] has expressed the opinion that it was most probably that pestilence, and his authority carries weight. There are, however, serious objections to the acceptance of relapsing fever as the Yellow Plague.

Relapsing fever is communicated to man in the British Isles solely through the agency of the louse, and it cannot spread from one person to another either by direct or by indirect contact. The infection is not communicated by the bite of the louse. The causal agent, a spirochaete, multiplies only in the blood of the louse, and the louse must be so injured that some of its blood escapes before the spirochaete can enter the human

body through the wounds in the skin made either by the bite of the louse or by the scratches of the host. Both the head and the body louse can in this way transmit the infection, but Buxton[15] considers that the body louse is the more important vector.

There is no doubt whatever about the presence of the louse in Britain and Ireland in the early centuries of the Christian era; indeed, the evidence indicates that human infestation was heavy and widespread throughout all ranks of society from the king to the slave. The ancient legend of the Irish hero, Cuchulainn, squatting naked in the snow, picking the lice out of his shirt, is well known, and Knott[39] states that there are numerous references, both in Irish and in Welsh texts, to warriors laying their heads in women's laps in order to have their scalps deloused. The Anglo-Saxon Leech Books and the pharmacopoeia of *The Physicians of Myddvai* both contain numerous recipes for the destruction of lice. The domestic habits of the Irish and the Britons were also conducive to louse infestation, and neither people apparently paid much attention to personal cleanliness. Writing about his fellow-countrymen in the twelfth century, Gerald de Barry[8b] says: "Finally however when the hour of sleep approaches, they lie down together in a communal bed laid all along the sides of the house, consisting only of rushes thinly interwoven and covered with a hard, rough cloth, such as the country produces, which is also in vulgar parlance called Brachan. Their night attire is not different from their dress by day. . . ." The "Dream of Rhonabwy"[43] may present an exaggerated picture of the distressing condition of Welsh home life during the period under review, but it provides an earlier confirmation of de Barry's account. "And when they came near to the house, they saw an old hall, very black and having an upright gable, whence issued a great smoke; and on entering, they found the floor full of puddles and mounds; and it was difficult to stand thereon, so slippery was it with the mire of cattle. . . . And being weary with their journey, they laid them down and sought to sleep. And when they looked at the couch, it seemed to be made of but a little coarse straw full of dust and vermin. . . . And after much suffering from the vermin, and from the discomfort of their couch, a heavy sleep fell on Rhonabwy's companions." Until quite recent times, the Irish in particular had an unenviable, almost international, reputation for personal lousiness and domestic filthiness. Boorde,[12] who wrote at the beginning of the sixteenth century, begins his description of Ireland with the remark: "I am an Iryshe man. . . . I love to wear a saffron shirt. . . . Pediculus other whyle

do byte me by the backe." He embellishes his chapter on Ireland with an old woodcut showing a woman picking lice off a man's head. Lodovico Falier, reporting about the state of Ireland to the Venetian Senate[16] about the same time, says: "The island is large and populous, the natives warlike and wild, especially inland, where under the doublet they wear a shirt steeped in saffron, on account of the lice. . . ."

Throughout the centuries of the Christian era down to modern times, Ireland appears indeed to have been something of an earthly paradise for the louse, and one of the strongest arguments in favour of the "Buidhe-connaill" being relapsing fever is the fact that Ireland was undoubtedly the home of that disease, insofar as the relapsing fever of the British Isles is concerned. At some time in the past, the host-parasite relationship of man, louse, and spirochaete must have begun either in Ireland or in the ancient society which colonised Ireland, according to tradition, from Spain. Most of the epidemics of relapsing fever in England and Scotland in the nineteenth century were imported by Irish immigrants, and Murchison[48] states that the London epidemic of 1851 was almost exclusively confined to Irish immigrants in that city.

The mere presence of lice, however, does not engender relapsing fever; it is the spread of lice infected with the spirochaete that governs the spread of the disease, and though, once infected, the louse harbours the spirochaete for life, the life of a louse is not long, rarely exceeding one month under the most favourable conditions. The louse is actually an extremely delicate creature when separated from its human host, and Buxton[15] states that "it is generally difficult to find lice away from man," and adds that "in army camps where men are heavily infested, most of the blankets are free from lice." The same authority states that "contact with lousy clothing in daylight—short of wearing—does not transmit because lice remain motionless in the light. Lice, however, may fall from the clothing, or be shaken out, and may spread rapidly over short distances when people are huddled together"; and "larvae may be distributed by wind action." Smart[59] emphasizes that clothing has a considerable effect upon the degree of individual infestation with the body louse, and that clothing which is worn continuously day and night provides ideal conditions for its existence. Bathing loses its value in the case of lousy persons if their old clothes carrying the lice and their eggs are put on again without being freed from the pests, an observation that explains why the Saxons were commonly lousy although they bathed frequently.

The chief vehicle for the spread of the body louse is the bed, and

Buxton[15] says that there is overwhelming evidence that infestation may be acquired at night from the bedding. If two men, one clean and one lousy, are placed in the same bed, the speed with which the clean one becomes infested depends upon the clinical condition of his partner. If the lousy man is febrile, the clean one complains of infestation in from one to two hours; if the former is healthy, the latter is not infested for from five to six hours. During the febrile period of relapsing fever, therefore, there is a quicker departure of lice from the patient than during either the prodromal, or the convalescent, stage of the disease.

There would appear, however, to have been few opportunities for the spread of infected lice with the speed, or over the area, commensurate with the speed and extent of spread of either the *Vad Velen* of Wales or the Yellow Plague of England; but even if it is held that infected lice could have spread as rapidly and extensively as those pestilences undoubtedly did, there are still objections to the acceptance of relapsing fever as the disease of the Yellow Plague.

Murchison,[48] in his exhaustive study of relapsing fever during its epidemic prevalence in England and Scotland in the first half of the nineteenth century, found that, although jaundice was a prominent symptom, "it was not so frequent as might be inferred from the importance attached to it by some observers," and he adds that although it "varies in frequency at different times and places, it has rarely occurred oftener than once in 5 cases, and is usually less frequent." Smith,[60] in his thorough investigation of the Glasgow epidemic of 1844, personally observed some degree of jaundice, ranging from a very slight tint of the skin and conjunctivae to the deepest jaundice, in 384 out of 1,000 cases, which gives a jaundice incidence of about 1 in 3. The incidence of jaundice in the British form of relapsing fever appears, indeed, to have been exaggerated by some medical writers, due possibly to its higher incidence in the tropical forms of the disease with which they are more familiar.

The mortality rate of Smith's cases was 4.3 per cent, and the impression derived from a study of Murchison's statistics is that the average mortality rate of the disease in the nineteenth century epidemics was about 5 per cent. Topley and Wilson,[66] in their account of all forms of the disease, remark that "the mortality is generally low—less than 6 per cent—but in some epidemics it has been as high as 30 per cent."

The first eruption of relapsing fever in a virgin population would almost certainly be attended by a much higher mortality rate than 6

per cent, and probably by a rate in excess of 30 per cent. The rate might, in fact, be commensurate with that which must be inferred from the records of the Yellow Plague. As far as its initial malignity is concerned, therefore, relapsing fever could have been the Yellow Plague; but there is no reason to suppose that this high virulence would be accompanied by a corresponding increase in the jaundice rate above that shown by the disease in the nineteenth century, and there can be no doubt that the incidence of the yellow coloration of the skin in the Yellow Plague must have approached closely to 100 per cent of the cases, otherwise this pestilence would not have been given that name.

There is one more point about relapsing fever that merits attention. The striking feature about the disease is not the concomitant jaundice but the character that gives it its name, to wit, the frequency and number of its relapses. After the primitive virulence of the disease had subsided, this character must have become prominent in subsequent epidemics and could not fail to have been recognized by the Irish and British peoples of the seventh century. There is no mention, however, of any disease resembling relapsing fever in the Irish Annals until A.D. 1078, when, according to Wilde,[17] there was a pestilence that was possibly typhus fever. Typhus fever and relapsing fever were confused until the middle of the nineteenth century, and both diseases are still known indiscriminately in Erse as *teascha,* the "hot pestilence," or *galar-naleabthan,* the "bed sickness."

When the conditions in England in A.D. 664 are given their due significance—the absence of urban populations, the dispersal of the people, the sparsity of population, the lack of communications, and the difficulty of travel—and are evaluated in conjunction with the facts that have been given about the epidemiology and character of relapsing fever, the balance of probability is, in my opinion, strongly against its acceptance as the Yellow Plague; and if the Yellow Plague was not relapsing fever, neither was the *Vad Velen* nor the *Buidhe-connaill,* because they were certainly one and the same pestilence.

If the Yellow Plague was not relapsing fever, what disease was it? I submit that it must have been a disease which showed, in the words of Osler and McCrae,[51] "a complete independence of the conditions of race, climate, and soil"; a disease that was so highly infectious that "the exposure must be but once and for a short time" to transmit the infection. The condition of England in A.D. 664 was such that only a disease with these characters could have first depopulated the south of England and

then spread to Northumbria. As it was, it seems most probable that the Synod of Whitby was instrumental in procuring its extension to Northumberland and that, without that congregation of clerics, it might never have passed north beyond the Humber, at any rate not in 664. There are only four diseases to my knowledge that fulfil these requirements, namely, pneumonic plague, influenza, measles, and smallpox.

Pneumonic plague can be ruled out at once, firstly because its arresting manifestation is the coughing or spitting of blood—and the discharge of blood from the body always excited profound alarm in early societies—and secondly because it is never associated with any yellow coloration of the surface of the body.

The history of epidemic influenza stretches far back, but only one type of influenza, the septic type, is accompanied by jaundice, and this type is not a distinct form of the disease, capable of breeding true and giving rise to particular epidemics. Its occurrence depends upon a symbiotic association, or a synergistic action, of the virus of influenza with certain other pathogenic bacteria in the body of the patient. In any epidemic of influenza, therefore, there will be a number of cases of the septic type, but I know of no record of an epidemic of septic influenza. Wilde[17] opines that the earliest notice of epidemic influenza in the British Isles occurs in the Irish Annals under the date of A.D. 1326; but there were undoubtedly much earlier epidemics in these islands, and the Irish names for the disease, *creatan, fuacht,* and *slaedan,* would seem to imply a much earlier visitation. I do not believe that any claim for the acceptance of the septic type of influenza as the Yellow Plague can be substantiated.

Measles can be eliminated because, although epidemics in virgin populations have been witnessed in modern times, notably the Fiji epidemic of 1875, the disease has never been associated with a yellow coloration of the skin.

There remains smallpox, which possesses all the characters required to explain the rapid spread and the high mortality of the Yellow Plague, because it was of smallpox that Osler and McCrae were writing in the quotation that I have given. Is there any record that links smallpox with the coloration of the skin that was the sign manual of the Yellow Plague? Holmes,[35] in his "Dissertation on Intermittent Fever in New England," refers to the extraordinary pestilence that decimated the American Indians some years before the arrival of the New England colonists, and states that the best description of it is in the "Collections of Gookin," from which he quotes the following passage: "What this disease was, that so generally

and mortally swept away, not only these, but other Indians, their neighbours, I cannot well learn. . . . I have discoursed with some old Indians that were then youths; who say, that the bodies all over were exceedingly yellow, describing it by a yellow garment they showed me, both before they died and afterwards." Then, in his article on "The Medical Profession in Massachusetts," Holmes[36] discusses the nature of the yellow pestilence that decimated the Indians. "What this pestilence was has been much discussed. It is variously mentioned by different early writers as 'the plague,' 'a great and grievous plague,' 'a sore consumption,' as attended with spots which left unhealed places on those who recovered, as making the whole surface yellow with a garment. Perhaps no disease answers all these conditions so well as smallpox. We know from different sources what frightful havoc it made among the Indians in after years, . . . in 1631, for instance, when it swept away the aboriginal inhabitants of whole towns, and in 1633. We have seen a whole tribe, the Mandans, extirpated by it in our own day. The word 'plague' was used very vaguely, as in the description of the 'great sickness' found among the Indians by the expedition of 1622. This same great sickness could hardly have been yellow fever, as it occurred in the month of November. I cannot think, therefore, that either the scourge of the East or our Southern malarial pestilence was the disease that wasted the Indians. As for the yellowness like a garment, that is too familiar to the eyes of all who have ever looked on the hideous mask of confluent variola."

To obviate the criticism that the early colonists would have recognized smallpox when they saw it, it is sufficient to point out that they had never seen the disease erupting in a virgin population. The disease with which they were familiar, although still a deadly disorder, had been tamed by centuries of endemic adaptation in the society of which they were members.

The author of the *Triad of the Breakfast Table* speaks with the dual authority of an able and experienced physician and a keen and accurate observer of human affairs, as his writings, both medical and literary, clearly testify. His conclusion that the yellow pestilence of the American Indians was smallpox cannot be challenged today, and the resemblance of that pestilence to the Yellow Plague is too exact to be a mere coincidence. I submit, therefore, that the yellow pestilence of the American Indians, the Buidhe-connaill of the Irish, the Vad Velen of the Welsh, and the Yellow Plague of the English, were each and all eruptions of smallpox among virgin populations.

There is probably no disease, not excepting plague, cholera, or measles, that has ever exceeded the malignity of smallpox during its first impact upon a virgin population, and certainly none that has maintained its malignity for a longer period of time. Prescott[56] has described the awful ravages of the disease among the virgin Aztec population during the Spanish conquest of Mexico, and the terrible scenes the Spaniards saw as they fought their way into the Aztec capital. "The floors of the dwellings were covered with the prostrate forms of the miserable inmates, some in the agonies of death, others festering in their corruption; men, women, and children, inhaling the poisonous atmosphere, and mingling promiscuously together. . . . Death was everywhere. 'A man could not set his foot down,' says Cortes, 'unless on the corpse of an Indian!' They were piled one upon another, the living mingled with the dead. They stretched themselves on the bodies of their friends, and lay down to sleep there. The city was a vast charnel-house, in which all was hastening to decay and decomposition." I have previously suggested[58] that this epidemic of smallpox was the decisive factor in ensuring the Spanish conquest of Mexico, and have quoted authoritative statements that it destroyed some three and a half million people, or approximately half of the total population of that country.

Cotton Mather,[46] in his account of the 1629-30 epidemic of smallpox among the American Indians, confirms Holmes' account of the terrible ravages of the disease among those people. The early colonists were greatly alarmed by the prospect of an Indian rising against them, "but this Fear," writes Mather, "was wonderfully prevented, not only by Intestine Wars happening to fall out among those Barbarians; but chiefly by the Small-Pox, which prov'd a great Plague unto them. . . . This Distemper . . . swept them away with a most prodigious Desolation, insomuch that . . . there was, it may be, not One in Ten among them left alive, of those few that liv'd; many also fled from the Infection, leaving the Country a meer Golgotha of unburied Carcases; . . ." Bradford[13] presents a more intimate picture of the disease among the Indians. "This spring, too, the Indians who lived around their trading-house fell sick of smallpox, and died most miserably. A more terrible disease cannot attack them; they fear it worse than the plague, for usually it spreads amongst them broadcast. For want of bedding and linen and other comforts, they fall into a lamentable condition. As they lie on their hard mats, the pox breaks and matters and runs, their skin sticking to the mats they lie on, so that when they turn a whole side will flay off at once,

and they will be all one gore of blood, dreadful to behold; and then, what with cold and other hardships, they die like rotten sheep."

Yes, smallpox could have destroyed half the population of sixth century Ireland, it could have made Wales almost a desert, and it could have "destroyed a great multitude of men" in the kingdom of Northumbria in A.D. 664. The peoples of the British Isles in the sixth and seventh centuries were no better equipped to withstand its ravages than the American Indians of the sixteenth and seventeenth, and both societies were alike in the dispersal of their populations and in the absence of urban aggregates to act as reservoirs of infection. Even as late as A.D. 1724, smallpox "wiped out the population of St. Kilda, or rather all but one of the adults, leaving a number of orphans to be brought up by a few men, who were marooned on another island, where they had gone bird-catching, while the epidemic ravaged the home population."[61]

When smallpox is accepted as the disease of the Yellow Plague, confirmatory evidence rapidly accumulates. Osler and McCrae[51] state that "the initial illness may be so severe that the patient may die before the appearance of the eruption," and, judging by the virulence of the disease after it had been endemic in England for centuries, it is a reasonable assumption that its first impact upon a virgin population would be attended by the death of many of its victims before the eruption appeared. I suggest that this first impact upon the population of Ireland was probably the *"blefed,"* and also probably "the great sickness" that ravaged Europe in the fourth century and the American Indians at the commencement of the seventeeth. By the time the next epidemic wave occurred, some degree of adaptation between host species and parasite had occurred, with the result that most of its victims lived long enough to exhibit the "hideous mask of confluent variola," which the Irish called the *Buidhe-connaill,* the Welsh, the *Vad Velen,* and the English, the Yellow Plague. A further degree of adaptation between host species and parasite allowed most patients to survive to show the confluent mass of crusts and scabs of the late stage of the eruption, that is to say, the "leprosy," the *samthrusc.* Finally, the adaptation of the host to the parasite, and vice versa, produced discrete cases of the eruption, in which the nature of the individual lesion could be seen, and then the Irish gave it the name, *bolgach,* the "blister disease," and the English called it "the pox." The Erse names for smallpox are *bolgach,* or *galar breac,* the "speckled disease."

Smallpox is the only disease that can explain this sequence of

different names for what were most probably successive epidemics of the same disease. By no stretch of imagination can either relapsing fever or septic influenza take its place, because neither is capable of evoking the skin lesions of the *samthrusc* and the *bolgach*. Attention has already been drawn to the curious names for the Yellow Plague in the Welsh records and in *British Goblins*—the "Yellow Putridity" and the "yellow spot before death." Both are descriptive of smallpox; they do not apply to any other infectious disease.

Assuming that the story of Maelgwn is true, he could have contracted smallpox just by conversing with a woman, or a youth, in the pre-eruptive stage of the disease from a window in Llanrhos Church. The only other diseases that could be transmitted under this condition are measles, pneumonic plague, and possibly influenza.

Adamnan,[1] in his *Life of St. Columba,* tells of the saint's vision of a dense, rainy cloud in the north rising from the sea on a clear day, and his prophesy: "This cloud will be very baneful to man and beast . . . it will discharge in the evening [over Ireland] a pestilential rain, which will raise large and putrid ulcers on the bodies of men and the udders of cows; so that men and cattle shall sicken and die, worn out with that poisonous complaint." St. Columba was born about A.D. 521, lived all his life in the British Isles, and died in A.D. 597.[14] We have to rely upon Adamnan's word for the fact that Columba saw this vision; but there can be little doubt that he had actually seen smallpox at some time in his life, and that he preceded Jenner by some twelve hundred years in his association of smallpox and cowpox. Stow,[65] under the date of A.D. 612, records that "in the moneth of August there hapned great earthquakes, [and] presently followed a most grievous pestilence, with extreme great Scabs and Botches upon most people, so that it was hard to discerne one man from another." He does not give any authority for this passage, but he may have had access to old records that have since been lost. It is possible that his chronology is faulty and that this is another reference to the Yellow Plague of 664; but assuming that his chronology is correct, his entry brings that pestilence into line with those of the Irish and Welsh epidemics, because it is most probable that the Yellow Plague was both preceded and succeeded by waves of smallpox, and there can be no doubt that the passage refers to an epidemic of that disease.

It is generally agreed that the name, "smallpox," is derived from the Saxon word, *pocca,* meaning a pouch, or bag, and until the advent of syphilis at the end of the fifteenth century, the disease was known

in England as "the pox." The appearance of the horrible skin eruptions, such as rupia, that were common in the early days of syphilis, earned for this disease the name of "the great pox," and the prefix "small" was then affixed to the older disease to distinguish it from syphilis. There are remedies for the pox, or the pock disease, in the pharmacopoeia of *The Physicians of Myddvai,* and there is one remedy for the "black pock," which the editor glosses haemorrhagic smallpox, but which may have referred to cutaneous anthrax. There is also a remedy for "Y Frech Fawr," which means literally the "great pock." It is tempting to connote this with syphilis, but it most probably stood for pemphigus, a very old disease which was known to the ancient Greeks. There are also numerous recipes for the pock disease in the Anglo-Saxon Leech Books, and, in fact, there is conclusive evidence that smallpox was well known in England and Wales by the beginning of the ninth century. It would take several generations for the disease to become stabilised sufficiently to evoke a constant clinical picture that could be given a popular name. Garrison[30] appears to have accepted the date A.D. 675 as conclusive for the establishment of smallpox in Ireland.

It does not seem to be essential to the argument that I have presented to trace the occurrence of smallpox outside the British Isles in the sixth century; but to obviate criticism that the argument premises the origin of the disease in these islands, I append quotations from the histories of Gregory of Tours,[32] and Paul the Deacon,[52] which show that it was prevalent in France at that time. Under the date of A.D. 582, Gregory records that "a great plague raged among the people during this year; great numbers were carried off by various malignant diseases, the symptoms of which were pustules and tumours; . . ." That this pestilence was not bubonic plague, which seems to be an obsession with some medical historians, but which had also entered southern France in the sixth century, is shown by his next statement: "We heard this year also of a malady of the groin which raged fiercely at Narbonne; it was of such a kind that if a man was once attacked, all was over with him." This was the "pestis inguinaria" that Bede mentions. Osler and McCrae[51] state that among the commonest complications of smallpox are boils, which often appear in successive crops over a long period of time. Their observation explains Gregory's reference to tumours, and also probably the tumour that appeared in St. Cuthbert's thigh, after he had recovered from an attack of the pestilence that visited Melrose in A.D. 664.[22] There is also the story of the deacon Vulfolaic of Yvois, which Gregory relates

under the date of A.D. 585-586. After describing how he had cast down and broken to dust an image of Diana, Vulfolaic was suddenly attacked by a disease that covered his whole body, from his head to the soles of his feet, so completely with pustules "that there might not be found void of them even the space that a finger-tip would cover." He attributed his recovery from this attack of confluent smallpox to the holy oil with which he anointed himself.

Paul, after recording a great earthquake in Rome in A.D. 617, says: "After these things there was a scab disease of such a kind that no one could recognize his own dead on account of the great swelling and inflammation." There are many other records which indicate that smallpox, or a disease very closely resembling it, was widespread in Europe in the sixth century. Indeed, there are records which suggest that it was prevalent in Europe many years before the outbreak that decimated Abrahah's army before the walls of Mecca in A.D. 575, and which has been regarded by Moore[47] and many subsequent writers as the first record of an epidemic of smallpox. The description of the Syrian epidemic of A.D. 302 by Eusebius,[28] for example, is very suggestive of smallpox. "An inroad or attack of a *certain other disease* of the ulcerative kind, commonly but properly enough denominated from its fiery nature, Anthrax; which spreading over the whole bodies of the sufferers, rendered their situation highly dangerous in all respects; but, by particularly affecting the eyes in most cases, it produced blindness in some thousands of men, women, and children." The Greek term "anthrake" has, of course, no connexion whatever with our modern disease of anthrax. If the disease described by Eusebius was smallpox, which seems very probable, and it was prevalent in Syria in the beginning of the fourth century, it is practically certain that it was widespread in Europe before the end of that century. The movements of the Roman troops alone would have disseminated it.

The fact that smallpox was prevalent in France in the sixth century means that it could have spread to England by direct transference across the Channel. Although it is not material to my argument to trace the exact course of the disease from Europe to England, the British records clearly indicate that it was present in both Ireland and Wales before it invaded England, and it seems probable that Wales was the first part of these islands that it attacked. The question therefore arises as to whether the disease could have been imported by the longer sea route by which the Celtic Christians returned from the Mediterranean. The incubation

period of smallpox is on the average twelve days, so that, allowing six days for the voyage from Bordeaux to St. Bride's Bay, it would be possible for apparently healthy people, who had acquired the infection in the south of France, to land in Wales and mix with their compatriots before they manifested the disease. It would also be possible for persons to import it into Ireland, because the voyage to Wexford Bay would probably not take more than seven days from Bordeaux. There is, however, the peculiar lesion, the buried pock, which would enable a person who had recovered from an attack of smallpox in the Near East to convey the disease directly to Wales or Ireland by sea, without any intervening contacts with the disease. The eruption of smallpox is always abundant on the hands and feet, and the pock may pass through all its stages beneath the thick horny coverings of those extremities without elevating the surface of the skin. The discs, harbouring the virus (Fig. 4), may persist for many weeks, and they must be picked out before the patient is rendered non-infective. It is improbable that this fact was known to the peoples of Europe in the sixth century.

Although I arrived at my belief that the Yellow Plague was smallpox independently, I cannot claim that it is original because Willan,[70] as long ago as 1808, affirmed that it was smallpox. He asserted that the disease was known to the peoples of Europe in the pre-Christian era, and he argued that the 'anthrakes' of the Hippocratic and later Greek writers were the pustules of smallpox. He had evidently read widely about this subject, and his discussion of the antiquity of that disease is a mine of quotations from, and references to, the works of ancient writers. He quotes the passage from Mario's Chronicle* in which the Latin name for the disease, 'variola,' is first used, and mentions that Nicaise, Bishop of Rheims, recovered from an attack of the disease in A.D. 452. Nicaise was martyred the following year, and after his subsequent canonization he became the patron saint of the victims of smallpox. Willan's account of the history of smallpox is worth reading, if only for the remarkable erudition it displays, a display that seems to have aroused Creighton's[25] envy, to judge from his spiteful criticism of Willan's work. Discussing the nature of the pestilence that ravaged England in the years from A.D. 664 onwards, he remarks that "Willan's erudition has

* Marius, Bishop of Avenche, a contemporary of Gregory of Tours, who compiled a chronicle in A.D. 569-570. The passage reads: "This year a violent fever, with flux of the bowels, and variola, afflicted both Italy and France."

FIGURE 4
Reproduced from *A System of Medicine*.
Edited by W. Osler and T. McCrae. London, 1907.

been used in support of a most improbable hypothesis that the pestilence of those years in monasteries and elsewhere was smallpox."

My support of Willan's argument has, up to this point, admittedly been based upon the assumption that the English pestilence of A.D. 664 was given the name of the Yellow Plague, if not by its actual victims, at least by their near descendants. There are historians, however, who will doubtless reject the argument because Bede does not so name the pestilence, and because the earliest use of the name, "The Yellow Plague," for that pestilence occurs in mid-twelfth century writings. An interval of nearly six hundred years is certainly a long period to be bridged by oral tradition; but those twelfth century writers possibly had access to older, or even contemporary, records that have since been lost. It seems to be a reasonable presumption that they believed they had authority for their designation of that pestilence because, in the absence of some authority, it is difficult to explain their choice of the epithet "yellow." If the pestilence was not characterised by a yellow coloration of the surface of the body, why did they choose "yellow?"

There is, however, other evidence which indicates, in my opinion, that the English pestilence of A.D. 664 was an epidemic of smallpox. I assume that those historians who attach such absolute importance to the contemporary record of Bede's will give equal credence to the contemporary records of Gregory of Tours and Paul the Deacon, and there can be no doubt that both these writers described pestilences in France that were epidemics of smallpox. With smallpox epidemic in the south of France in the middle of the sixth century, the wonder is that it took so long to spread to England.

As Bede appears to be the unassailable authority upon the identity of the English pestilence, however, I will conclude my argument with a consideration of some additional evidence that he provides. I have selected King's[38] translation because it is the most recent one of which I am cognizant, which will presumably make it the most acceptable translation to the critics. Writing about the monastery of Barking, which was evidently a double monastery housing, in separate quarters, both monks and nuns, Bede says: "When the tempest of the calamity so often mentioned, storming abroad over all the country, had also fallen upon that part of the monastery where the men did live, and daily one or other was carried off to the Lord, . . ." the abbess began to make provision for a similar mortality among her nuns. According to Sellar,[57] the monastery at Barking is generally supposed to have been founded in

A.D. 666, but there does not seem to be a shadow of doubt that Bede was referring to the pestilence that erupted in A.D. 664 in the above passage.

Still writing about Barking, Bede tells how "a little boy of about three years old, not more, named Esica, which because of his age, being yet a very infant, was wont to be brought up in the house of the virgins dedicated to God and con his lesson there," died of "the foresaid plague." Esica evidently communicated the disease to the nun, Eadgyth, who was possibly his special tutor, and who died on the same day that he did. There were probably ample opportunities for the pestilence to spread from the male to the female side of the monastery, but in Esica we have the link which Bede himself supplies, because there can be little doubt that a child of that age would be the pet, and have the run, of the whole monastery.

We now have Bede's authority for the fact that the pestilence of A.D. 664 was introduced among the nuns of Barking, and that the abbess was one of its first victims among them. It is in connexion with the death of the nun, Tortgyth, however, that Bede provides what would seem to be conclusive evidence that the pestilence was smallpox. He writes: "Now when Tortgyth, the foresaid handmaid of Christ, had her life prolonged three years after the death of the abbess, she was so far pined away with the sickness that we spoke of before, that the skin and bones did scant cleave together, and at last, the time of her release being now at hand, she could not only stir none of all her limbs but could not move her tongue."

At first sight, there may appear to be no connexion between Tortgyth's protracted illness and smallpox. It is probable that variola virus alone is incapable of causing such a state, even in a peculiarly susceptible host, but there is invariably a concomitant staphylococcus infection, and many of the sequelae of smallpox are due to the action of the staphylococcus. It was probably the staphylococcus, rather than the virus, that was responsible for the condition of the Jamaican youth who was seen by Paul,[53] at Kingston, in 1831. "He had been ill for some time," says Paul, "and such was the solution of the solids, that the scapular extremity of each clavicle had separated from its attachment, and had worked its way through the flesh, about three inches from each shoulder, where they appeared, from 1½ to 2 inches in extent, naked and dead bones, denuded even of the periosteum. Both trochanters were exposed, and the knee-joints were in the same state; indeed, no limb could be raised without

fear of separating its attachments. The flesh was of a livid colour, discharging a thin sanies, having the appearance of animal food in the last stage of putrescency; yet this object retained life, I believe, for some days after I saw him."

Allowing for the difference in description between a layman who was writing from hearsay and a surgeon who was recording a personal observation, and who were separated in time by an interval of almost twelve hundred years, the two cases of Tortgyth and the Jamaican boy would seem to be as nearly identical as one could hope to obtain. It is possible that some disease other than smallpox could produce the conditions described: I can only say that I know of none, and that I have not encountered a similar description in an extensive study of the literature of disease during the past eight years.

I cannot claim Willan's erudition, because I lack his obvious familiarity with Greek and Latin, but I am content to be able to support his thesis that the pestilence of A.D. 664 was smallpox. The charitable explanation of Creighton's criticism is that it was based upon a faulty and incomplete knowledge of the aetiology and epidemiology of smallpox and, in the last analysis, it is the epidemiological character of the disease that provides the strongest argument for its acceptance as "The Yellow Plague."

REFERENCES

1. Adamnan. Life of St. Columba. In: *Historians of Scotland.* Edited by W. Reeves. Vol. 4. Edinburgh, 1874.
2. *The Anglo-Saxon Chronicle.* Translated by J. A. Giles. London, 1847.
3. *Annales Cambriae.* Edited by J. W. ab Ithel. (Rolls Series.) London, 1860.
4. *Annals of Clonmacnoise.* Translated by C. Mageoghan, 1627. Edited by the Rev. D. Murphy. Dublin, 1896.
5. *The Annals in Cotton MS. Titus A. XXV.* Transcribed and edited by A. M. Freeman. Paris, 1929.
6. *Annals of the Kingdom of Ireland by the Four Masters.* Translated by J. O'Donovan. Dublin, 1856.
7. *Annals of Ulster.* Edited by W. M. Hennessy. Dublin, 1887.
8. De barry, G. *Giraldi Cambrensis Opera.* Vol. 1. Edited by J. S. Brewer. (Rolls Series.) London, 1861.

8a. De barry, G. *Ibid. De jure et statu Menevensis ecclesiae.* Vol. 3.

8b. De barry, G. *Ibid. Descriptio Kambriae.* Vol. 6.

9. Baxter, J. H. and Johnson, C. *Mediaeval word list.* London, 1934.
10. Bede. *The Venerable Bede's ecclesiastical history of England.* Edited by J. A. Giles. London, 1847.
11. Bonser, W. Epidemics during the Anglo-Saxon period. *J. Brit. archaeol. Ass.*, 1944, *3d ser. 9.*
12. Boorde, A. *The first boke of the introduction of knowledge made by Andrew Boorde of Physycke Doctor.* Edited by F. J. Furnivall. (Early English Text Soc.) London, 1870.

13. BRADFORD, WM. *Bradford's history of the Plymouth Settlement, 1608-1650.* Edited by V. Paget. London, 1909.
14. BUTLER, A. *The lives of the saints.* Edited by H. Thurston. Vol. 6. London, 1937.
15. BUXTON, P. A. *The louse.* London, 1947.
16. *Calendar of state papers Venetian.* Vol. 4. Nov. 10. No. 694. 1527-1533. Edited by R. Brown. London, 1867.
17. *The census of Ireland for the year 1851.* Compiled by Sir W. Wilde. Part 5, Tables of Deaths. Dublin, H. M. Stationery Office, 1856.
18. *Chronicon Scotorum.* Edited with a translation by W. M. Hennessy. London, 1866.
19. COCKAYNE, O. *Leechdoms, wortcunning and starcraft of early England.* (Rolls Series.) London, 1864.
20. COLGAN, J. *Acta sanctorum.* Vol. 1 [March.] London, 1647.
21. COLLINGWOOD, R. G. and MYERS, J. N. L. *Roman Britain and the English settlements.* 2nd. ed. Oxford, 1941.
22. COLGRAVE, B. *Two lives of St. Cuthbert.* Arranged by B. Colgrave. Cambridge, 1940.
23. CRAWFORD, O. G. S. Quoted by E. G. Bowen: The settlements of the Celtic saints in South Wales. *Antiquity,* December, 1945, No. 76.
24. CREIGHTON, C. In: *Social England.* Edited by H. D. Traill and J. S. Mann. Vol. 1 London, 1902.
25. CREIGHTON, C. *A history of epidemics in Britain.* Cambridge, 1891.
26. CULLINAN, E. R. The British encyclopaedia of medical practice. Edited by Sir H. Rolleston. London. 'Surveys and Abstracts'. 1939.
27. DARBY, H. C. *An historical geography of England.* Cambridge, 1936.
28. EUSEBIUS. *Ecclesiastical history.* Book 9. Quoted by R. Willan.
29. FRENCH, H. and DOUTHWAITE, A. H. *An index of differential diagnosis of main symptoms.* 6th ed. Bristol, 1945.
30. GARRISON, F. H. *An introduction to the history of medicine.* London, 1922.
31. GILDAS. *De excidio Britanniae.* In: *Six old English chronicles.* Bohn's Antiq. Lib. London, 1848.
32. GREGORY OF TOURS. *The history of the Franks by Gregory of Tours.* Translated by O. M. Dalton. Oxford, 1927.
33. HIGDEN, R. *Polychronicon Ranulphi Higden Monachi Cestrensis.* Edited by C. Babington. (Rolls Series.) London, 1865.
34. HODGKIN, R. H. *A history of the Anglo-Saxons.* Oxford, 1935.
35. HOLMES, O. W. Dissertation on intermittent fever in New England. In: *Boylston prize dissertations for the years 1836 and 1837.* Boston, U.S.A., 1838.
36. HOLMES, O. W. The medical profession in Massachusetts. In: *Medical essays, 1842-1882.* London, 1891.
37. *Iolo manuscripts.* Translated by T. Williams. The Welsh MSS. Society. Liverpool, 1848.
38. KING, J. E. *Baedae: Opera Historica.* (Loeb Classics) London. 1930.
39. KNOTT, Professor Eleanor. Personal communications to the author.
40. LEVISON, W. *England and the continent in the eighth century.* Oxford, 1946.
41. LLOYD, J. E. *A history of Wales.* 3rd ed. London, 1939.
42. *The Liber Landavensis, Llyfr Teilo.* Translated by W. J. Rees. Llandovery, 1840.
43. *The Mabinogion.* Translated by Lady Charlotte Guest. London, 1906.
44. MACARTHUR, SIR W. Appendix to W. Bonser's epidemics during the Anglo-Saxon period (ref. 11).
45. MARSHALL, J. F. *The British mosquitoes.* London, 1938.
46. MATHER, C. *Magnalia Christi Americana.* London, 1702.
47. MOORE, J. *The history of smallpox. London,* 1817.
48. MURCHISON, C. *A treatise on the continued Fevers of Great Britain.* 2nd ed. London, 1873.
49. MURRAY, J. A. H. *A new English dictionary.* Oxford, 1914.

50. MYDDVAI. *The Physicians of Myddvai; Meddygon Myddfai.* Translated by J. Pughe. Edited by J. W. ab Ithel. (Welsh MSS. Soc.) Llandovery, 1861.
51. OSLER, W. and MCCRAE, T. *A system of medicine.* London, 1907.
52. PAUL *the Deacon. The history of the Langobards.* Translated by W. D. Foulke. Philadelphia, 1907.
53. PAUL. Fierce attack of epidemic variola. *Lancet,* April 11, 1835.
54. PIRENNE, H. *Mohammed and Charlemagne.* London, 1940.
55. PLUMMER, C. *Venerabilis Baedae. Historiam Ecclesiasticam Gentis Anglorum.* Vol. 1. Oxford, 1896.
56. PRESCOTT, W. H. *The conquest of Mexico.* London, 1909.
57. SELLAR, A. M. *Bede's Ecclesiastical History.* London, 1907.
58. SHREWSBURY, J. F. D. Epidemic disease and history. *Queen's med. Mag.,* June 1947, *30,* No. 2.
59. SMART, J. *Lice.* Brit. Mus. (Nat. Hist.) Economic Series, No. 2A. London, 1942.
60. SMITH, E. Some account of the epidemic fever prevailing in Glasgow. *Edinburgh med. surg. J.,* 1844, *61,* 67-74.
61. SMITH, G. *Plague on us.* London, 1943.
62. STENTON, F. M. *Anglo-Saxon England.* 2nd Edition. Oxford, 1947.
63. STOKES, W. *Lives of the saints from the book of Lismore.* Oxford, 1890.
64. STOKES, W., Ed. *The tripartite life of St. Patrick.* Vol. 1. (Rolls Series.) London, 1887.
65. STOW, J. and HOWES, E. *The annales or generall chronicles of England.* London, 1615.
66. TOPLEY, W. W. C. and WILSON, G. S. *Principles of bacteriology and immunology.* Vol. 2. 3rd ed. London, 1946.
67. TRAILL, H. D. and MANN, J. S. *Social England.* Vol. 1. London, 1902.
68. *Triads of the Isle of Britain. The Myvyrian archaeology of Wales.* Edited by O. Jones, E. Williams, and W. O. Pughe. Denbigh, 1870.
69. VERGIL, POLYDORE. *Polydore Vergil's English history.* Edited by Sir H. Ellis. (Camden Soc.) London, 1846.
70. WILLAN, ROBERT. *Miscellaneous works of the late Robert Willan, M.D., F.R.S., F.A.S.* Edited by Ashby Smith. London, 1821.
71. WILLIAMS, R. *The history and antiquities of the town of Aberconwy.* Denbigh, 1835.

A History of Psychiatric Nursing in the Nineteenth Century

PART I

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ONE of the "secrets" of psychiatric therapy as practised by the Reverend Maister Alexis of Piedmont, who wrote in 1850 on *The Cure of a Madde Manne,* was to "speake often tymes soberly and wisely" to such a patient, "admonishing hym to be wise and sage, rebuke hym of his follie when he doeth or speaketh any fonde thynges: and in such case the authoritie of some faire woman availeth muche, to tell hym all these thynges: for good admonitions are of greatt vertue and strength, for to establishe and settle a braine, troubled or disquieted with any sicknesse or passion." Such an implied awareness of the therapeutic importance to the psychiatric patient of interpersonal relationships, particularly those of the nursing personnel around him, was greatly in advance of the times in which these statements were uttered. Indeed, it is only recently that the formal theory and practice of psychotherapy have developed as an essential part of the total process of psychiatric treatment, a development bringing in intimate association with it an increasing awareness and knowledge of the meaning of psychological disturbances and stressing the importance and significance of the dynamic interplay of emotions, thoughts, and acts between the patient and everyone engaged in helping him. In this latter respect, psychiatric nursing is just beginning to be effectively integrated into the total psychopathological and psychodynamic patterns of the psychiatric helping process. The history of psychiatric nursing is, therefore, of considerable interest as a background for the understanding and consideration of the present status and of the future goals of nursing functions in psychiatric settings.

The nineteenth century is a particularly important period in the history of medicine, for it was during this century that psychiatry and nursing were established as formal disciplines. Both have a history as

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old as man himself, but it was not until after 1800 that psychiatry began to be considered as a valid medical specialty and not until 1859 when Florence Nightingale's *Notes on Nursing* appeared in London that nursing began to be considered as a valuable functional aid to medicine. The first nurses' training school in the United States was not established until rather late in the century—1872.

The historical antecedents to the psychiatric care and treatment existing at the beginning of the nineteenth century are well known and need not be given in detail here. Until 1800 hospitals devoted exclusively to the care of the mentally ill were a rarity, and society did not concern itself with the medical treatment of mental patients but confounded them with thieves and vagabonds and confined them in prisons, almshouses, or sometimes, because of an accompanying recognizable disease, they were admitted to general hospitals. The first custodial institution anywhere in the world devoted to the care of the mentally ill was probably that established in Florence, Italy in 1389, but only sporadic efforts properly to house and care for psychiatric patients were made until the years following 1800. Spanish psychiatrists have always been fond of pointing out that one of the first "asylums for the insane" was built at Valencia in 1409, following the public education activities of the Spanish monk, Juan Gilberto Joffre, sometimes also called Fray Jofre Gilberto, who, like Dorothea Dix in the nineteenth century, awakened the people of his times to the needs of those who were psychologically "dys-eased." The famous Bethlem Hospital (Bedlam) in London housed mental patients as early as 1403, and there were psychotic patients at the Hôtel Dieu in Paris in 1660.

In this country in New York City a "Poor-house, Work-house, and House of Correction" opened in 1736 and had some special dungeons in one end of the cellar for the mentally ill. In 1752 mental patients were admitted to the Pennsylvania Hospital in Philadelphia, the first hospital in the United States to make definite provisions for the care of such patients. The New York Hospital made similar facilities available shortly afterwards. In Williamsburg, Virginia, the first state hospital was established in 1773.

The conditions generally prevailing in the "asylums" at the turn of the eighteenth century were created by many factors, but they were influenced chiefly by the consideration that keeping the mental patient safe for himself and others was the main objective of psychiatric care. Indeed, according to English common law, no person was justified in

confining a mentally ill subject unless his illness was of such a character as to make him dangerous either to himself or to others. The equation between insanity and personal violence, which still exists in popular thought, was fostered, therefore, both by law and by the psychiatric practice of the time.

Restraints in the form of leather muffs and wriststraps, long leather sleeves, iron handcuffs, hobbles for the legs, and the use of the restraint chair and of the straitjacket were common. Many of the patients were confined to bedsteads by means of straps passing through iron loops, and it was not at all unusual, particularly in the English asylums, for the patients to be chained to their beds over the week-end in order to give the keepers and attendants a holiday over Sunday.

Added to this dismal picture were the crowding, the filth, the inadequate comforts, the indiscriminate grouping of patients without regard for the degree of acuteness of illness, the frequent lack of sexual segregation, and the brutality and ignorance of many attendants and keepers. Into such a discouraging situation at the beginning of the nineteenth century the conception of non-restraint and of psychological understanding in the treatment of psychiatric patients began slowly to make way.

The end of the eighteenth century had witnessed the revolutionary culmination of growing liberal thought which was intensely interested in the implications of human individuality. This concern about the political and social position of individual men was reflected in the care and treatment of the mentally ill. What the nineteenth century was to refer to as the "moral" treatment of such patients was already in the psychological atmosphere of the eighteenth. Patients in the mental hospital at Saragossa, Spain, for example, had already been given a certain amount of non-restrained liberty, and this was also true of some asylums in Holland, Belgium, Savoy, England, and France, as well as in America.

Daquin, a physician of Chambéry, had written in 1791 *On the Philosophy of Madness* in which he insisted, according to the subtitle, "That this malady ought to be treated by moral rather than by physical means." Daquin had already begun, somewhat cautiously, to free the psychiatric patient from his restraining fetters. Chiarugi in Italy was similarly engaged in non-restraint reform. In 1793, Philippe Pinel, after ten years of the study and practice of "moral" treatment, began gradually to unshackle the mental patients who had been chained to the dripping

walls of the French asylum, the Bicêtre. Langermann in Germany and, in England, William Tuke of York Retreat and Dr. Charlesworth and Gardiner Hill of Lincoln Asylum became almost immediate protagonists of non-restraint, and John Conolly in 1839 announced the abandonment of all mechanical restraint in Hanwell, the large English asylum over which he presided. In spite of these early beginnings, a good deal of the literature in the psychiatric journals throughout the century still concerned itself with discussions of the non-restraint reform, and "moral" treatment never entirely displaced "physical" treatment.

Indeed, although the "moral" treatment of the psychiatric patient was introduced most formally on the continent, English and American psychiatrists became the most ardent protagonists of non-restraint and there was perhaps more complete freedom from physical restraint in English mental hospitals than anywhere else. In addition to Langermann, the famous German psychiatrists of the middle nineteenth century, Griesinger and Westphal, were favorable to the principles of non-restraint, but that no general conversion to these principles obtained in German psychiatry at large may be seen from the discussions at the meetings of the Psychological Society in Berlin and Heidelberg in 1879. In France, too, although Morel sanctioned and Magnan practised non-restraint, there was strong feeling against it among most other French psychiatrists as late as 1880.

The reluctance to abandon the use of restraint was influenced in great part by the total situation in psychiatric treatment in these years. It had not yet been proven that the violence and vindictiveness of many psychiatric patients were not an intrinsic part of their illness but were largely induced by the treatment that they were receiving. Paradoxically, it was the actual use of mechanical restraint and the atmosphere in which it was employed that evoked psychological reactions in patients that seemed to make the use of restraint necessary. That this consideration did not occur to most of the hospital administrators of the time may be inferred from the 1844 report of the Metropolitan London Commission which expressed the commissioners' fears about "what would happen to male attendants if mechanical restraints were abolished."

Nevertheless, one of the most significant but not immediately recognized effects of the removal of restraints was the alteration of the interpersonal situation between the patient and the medical and nursing personnel caring for him. Freed from restraints, the mentally ill person had to be dealt with as a personality. An understanding of the meaning

and motivations of his behavior could no longer be denied by what, in effect, amounted to a psychological defense-mechanism of "putting him out of mind" by clapping him into restraints. Nor could the aggression of the psychiatric personnel, evoked by their frustration in being unable to deal with or to understand the patient's irrationality, now discharge itself easily and destructively against the patient. It thus became necessary to enter with increasing awareness into a psychological relationship with the patient. The progressively expanding concern over the psychological and therapeutic meaning and importance of this relationship constitutes the major development in psychiatric nursing during the last hundred years.

The elimination, or at least the deprecation of the use of restraints, therefore immediately focused attention on the nursing personnel. In the early nineteenth century the members of nursing staffs in pauper asylums were frequently mentally ill themselves and were, in some instances, recruited from the criminal population. In 1808, Haslam wrote of nursing, "although an office of some importance and great responsibility, it is held as a degrading and odious employment, and seldom accepted but by idle and disorderly persons." In certain English asylums, particularly, patients sometimes were employed as assistant attendants, especially on the night shifts. Conolly[2] observed in 1856 that "in some of the wards, especially on the female side, the nurses were worse dressed and wilder looking than the generality of the patients, and the scenes daily witnessed were what might be expected."

On the continent the nursing care of asylum patients was in many places in the hands of the Catholic nursing orders. In the Hospice of St. Julien, Belgium, the custody of the "aliénés" was committed entirely to the Sisters of the Order of St. Augustine. An English traveler recorded in 1856[1] that the patients were "excessively fond of the Sisters and seemed to obey them from motives of love and gratitude." In this country at the same time the Sisters of Charity were engaged in psychiatric nursing in several places, one of the best known being the private Mount Hope mental hospital near Baltimore. But in Germany the suggestion made in 1855 that the Catholic Sisters of Charity be used as attendants for the insane was opposed by the German psychiatrist, Damerow,[3] who believed that the Sisters should, in any event, confine themselves to the care of the female patients only and that they should have no voice in the management of the hospitals. Zeller[10] too, felt that the "Sisters were not competent to manage insane, and particularly,

raving men, and that according to the nature of the weaker sex, modesty and custom alike forebade their intercourse with them."

This opposition on the part of German psychiatrists to the widespread utilization of nursing orders was probably in part conditioned by the political relations existing between the church and the state and a fear that the psychiatrists would not be master in their own house. Nor was such a fear entirely unfounded. In the north of France, for example, the Brothers Bonfils had a sort of monopoly in taking charge of the insane, and as recently as 1844 *les Frères Hospitaliers de St. Augustin* claimed not merely to nurse but also to treat the mentally ill, and they were actually entrusted with the complete care of certain psychiatric establishments.

The Sisterhood of St. Vincent de Paul, which supplied many of the psychiatric nurses of the time, required of the candidate a period of three months or more of probation and two or three years spent as a novitiate before she was considered "worthy of a place as an attendant in a pauper lunatic asylum." This Order also recognized two classes of Sisters, the serving or domestic Sisters and the regular Sisters, a division corresponding closely to the present distinction between attendant and nurse. The founder of the Sisters of Charity had himself worked assiduously for the separation of the mentally ill from the ordinary surgical and medical patients and from criminals. He also agitated for the opening of special psychiatric wards in general hospitals as well as for the erection of mental hospitals.

It is of incidental interest to remark that some of the functions of the modern psychiatric case worker were also first assumed by the Sisters of Charity who used to wait at the gates of the French mental hospital, La Salpêtrière, and take under their care the discharged convalescents for after-care and rehabilitation. These centers were the historical forerunners of the "After-Care Association for Befriending Persons Discharged from Asylums for the Insane" which was inaugurated in 1879 in the house of the famous English psychiatrist, Sir John Bucknill, by the Reverend Henry Hawkins, chaplain of the Colney Hatch Asylum. The Sisters were also the precursors of the various institutions for the "after-care" of the psychiatric patient that came into existence in the last few decades of the nineteenth century in Switzerland, France, and in the Duchy of Hesse in Germany.

An indication of the state of psychiatric nursing in England in 1850 may be inferred from the remarks of Robertson[9] who, in referring to

the four hundred Sisters of Charity engaged in mental hospitals in Belgium, wrote: "Would that we in Protestant England could point, not to four hundred but to forty sisters thus engaged for the love of the Lord Jesus, and without any thought of self or gain, in the tending on our insane poor." Echoing a similar plea, an editorial in the *American Journal of Insanity* for 1848 expressed "hopes of seeing in our country an institution for the instruction of such Protestant women as are willing to devote themselves to the care of the sick poor and the relief of mental and bodily suffering."

The Kaiserwerth Reformed Church movement in Germany supplied at least part of the answer to the problem of Protestant nursing. Pastor Fliedner and his wife had founded in Kaiserwerth the Protestant nursing sisterhoods, although other Protestant nursing orders, like the Damsels of Charity (1560), had been established much earlier. Among the Kaiserwerth hospital buildings was an asylum where psychiatric nursing experience was obtained by the training sisters.

In 1849 Florence Nightingale went to the provinces on the Rhine where the psychiatrist Jacobi had worked to establish adequate nursing care for his patients in the Siegburg Asylum, and at the same time she also visited Kaiserwerth and was impressed in both institutions with the quality and progress of the training in the nursing care of mental patients. Her experiences and observations in these places contributed greatly to her formulations about nursing education and practice in general hospitals.

Earlier in the century William and Samuel Tuke in England, Damerow and Roller in Germany, Aubanel in France, and Kirkbride in America were calling attention to the need for adequate training for psychiatric nursing personnel. In France, Aubanel urged the formation of an institutionalized training program which would furnish trained attendants for all the asylums in the country. Esquirol and Ferrus, French psychiatrists of the early nineteenth century, advocated sickness and old-age benefits for attendants, and in 1863 Berthier proposed elevating psychiatric attendants to the status of public officials. In 1847 the Jacobi Society was formed in the Rhenish district of Sieburg in honor of the psychiatrist, Maximilian Jacobi. The objectives of this society were to improve the care of the insane by improving the moral and intellectual education of psychiatric attendants. Premiums were given at the end of each year for the faithful and intelligent discharge of duties.

The question of the propriety of female nurses attending male

mental patients was a great concern of early nineteenth century psychiatry. The increasing acceptance of the psychiatric patient as a legitimate subject of medical understanding and attention, however, led gradually to the extension of female nursing care to the mentally ill male patient. Dr. Samuel Hitch, the founder of the British Medico-Psychological Association, in 1841 employed the wives of some of his male charge-attendants in the nursing of the male patients in the Gloucester Asylum. The American psychiatrist, Isaac Ray, visited mental hospitals in Great Britain in 1845 and observed in one or two English and Irish asylums that female attendants were employed in the galleries of male patients. However, the idea caught on very slowly even though Crichton-Browne, writing in 1867, observed that after the introduction in the West Riding Asylum of a female nurse on a large ward with seventy epileptic and suicidal patients the floor became "quieter and more orderly under her influence and a marked change for the better has taken place in the personal neatness and general deportment of the patients." He added that "their whole nature seems to have been softened and their tone of feeling ameliorated." Dr. Bemis of the Worcester State Hospital (Massachusetts) was asking in 1867 for female nurses on male wards, and more women were gradually added from this time onward to these wards in mental hospitals.

In the London Asylum in Canada, for example, three women were employed on the male side in 1883 to attend to household duties, supervise the indoor work of patients, and to associate with their patients on the wards. They were required to be "widows of good character." In 1890 the widow of a chief attendant was placed in charge of the male attendants in the Royal Edinburgh Asylum. Six years later the new mental hospital at Fife and Kinross, Scotland was staffed entirely by women, and several other Scottish asylums soon followed suit. Interestingly enough, however, a general hospital, the Wilhelmina Gasthuis in Amsterdam, Holland was among the first institutions to have female nurses in charge of male psychiatric patients. Female nurses took a six months' course on the psychiatric wards of this hospital as a regular part of their training.

Before the introduction of formal nurses' training schools near the end of the century, the change to a female nursing staff on the male services was accomplished by employing a married couple as the nursing personnel for a male ward. In England the practice of employing attendants' wives to assist their husbands was widely adopted between 1860-

1890. Nevertheless, the question of female nurses on male psychiatric floors was still being heatedly debated in 1900, although it was becoming gradually apparent that there were very few such patients who could not be adequately treated by female nursing care. Moreover, it was obvious even to the nineteenth century psychiatrists that one of the most significant indices of the adequacy of psychiatric medicine was the number and quality of well-trained nurses on both the male and female services of the psychiatric hospital. The high mortality which prevailed in many of these nineteenth century mental hospitals among the male patients (a mortality which was on the average about a third greater than that obtaining for females) was certainly due in some degree to the absence of adequate nursing for the male patients. Even today there is no better index of the standard of psychiatric care in the mental hospital than the amount of competent nursing care which is available to all patients in the hospital. In a comparison of present-day nursing services in psychiatric institutions with those existing in the last century, it is only necessary to remember that as recently as five years ago there existed in this country at least one 3,000-bed mental hospital without a single graduate nurse on its staff.

Just as the gradual extension of female nursing care to male psychiatric patients was accomplished by enlightened psychiatric thinking of the nineteenth century, so too was there a developing movement to spread competent nursing care over the twenty-four hours of the mental hospital day. In the early part of the century many of the asylums had no night nursing supervision at all, but the day attendants were required to sleep on their floors and to respond to any night demands of an emergency nature. Such an arrangement obviously produced neither adequate night care nor allowed the undisturbed sleep requisite for good day care.

The next move was to employ a night watchman, although even this move was protested by some asylum superintendents. At the eighth annual meeting of the Association of Medical Superintendents of American Institutions for the Insane in 1853, it was objected that the "watchman would keep the house in an uproar and the patients would demand of him to see the doctor." In the same meeting[5] it was insisted that the day attendants should "discipline themselves to sleep lightly." Nevertheless, it was the final opinion of this group that "a night-watch, one of each sex, should be employed" and that "the attendants should not have to get up at night."

In some instances, particularly in Scotland, where in order to reduce expenses only one individual was appointed as "night-watch," this was usually a woman who visited both male and female sides of the house. Since the duties of a night nurse at this time were "to get up patients habitually wet or dirty, to attend to the sick, and to help the feeble and the epileptic,"[8] it was felt that a male watchman could not with propriety be entrusted with these duties on the female side of the house. The experience with female "watchmen" further confirmed the advantages of female nursing personnel on the male services.

In 1854 Dr. Kirkbride of Philadelphia suggested that it might be a good idea to employ night as well as day attendants. A few years later the Columbus State Hospital in Ohio was employing special night attendants for suicidal patients, and at the Mount Hope Retreat a well-organized system of special night nursing was in operation, composed of the Sisters of Charity. During the last forty years of the century Dr. Kirkbride's suggestion was gradually put into general effect. Concomitantly with the practice of assigning regular night attendants to duty in the psychiatric hospitals, it then became possible to give attendants and nurses living quarters off the patients' floors and outside the patients' buildings.

The progress of psychiatric care in the nineteenth century was also evidenced in the increasing number of attendants employed in the mental hospitals. Before 1850 the average ratio of attendants to patients was one to fifty. Afterwards, the ratio came in general to be about one to fifteen and in many specific instances it was much lower. In 1869, for example, the New York State Lunatic Asylum at Utica, New York employed one attendant for every nine male patients and one for every six female patients. In French asylums the average attendant-patient ratio for the last half of the century was one to ten.

The nineteenth century's depreciation of the equality of women was reflected in the wage differential which existed between male and female attendants. By 1870 there was considerable agitation to equalize this disparity, which at the time was still apparent in the $15 monthly salary for females as contrasted with the $25 monthly wage for males. This difference in wages continued even after 1890 when graduate psychiatric nurses were beginning to enter the field from the newly established training schools. Graduate nurses received $25 monthly at this time, while private duty psychiatric nurses ordinarily received $20

weekly and, occasionally, $25. Male psychiatric nurses, however, got "exorbitant rates" of $4 and $5 a day for private duty.

Even with the general employment of night attendants after 1860 and the consequent release of the day attendants from the necessity of sleeping on their wards, the hours of work in the mental hospital continued to be long. In 1869 female attendants in the Pennsylvania Hospital for the Insane had only one afternoon out of every two weeks and only every third Sunday off. As late as 1900 it was not at all uncommon for the psychiatric nursing personnel to be working fourteen-hour day duty and ten-hour night duty for six and a half days weekly. Only in 1907 was the three-shift working day inaugurated in this country by the state hospital in Kalamazoo, Michigan.

The development of formal instruction in psychiatric nursing was largely encompassed within the last twenty years of the nineteenth century, although informal courses of instruction had been given to attendants rather regularly from the latter part of the eighteenth century onwards. The New York Hospital, for example, was giving such a course in 1798. In 1854 classes for the training of mental nurses were established in Scotland, although it was not until 1890 that the British Medico-Psychologic Association directed a committee to "consider and report on a systematic training for nurses in asylums for the insane, the keeping of an efficient register for nurses, and the granting of certificates of proficiency."[4] *A Handbook for Attendants* had been prepared by this Association in 1885.

In America the agenda of the first meeting of the Association of Medical Superintendents for American Institutions of the Insane held in 1843 contained the subject of a manual for attendants. This was prepared by Dr. Curwen in 1851, and no other significant handbooks or texts on psychiatric nursing appeared until after 1885 and the founding of the psychiatric nursing training schools. Of these latter publications, a manual by Dr. Granger of the Buffalo State Asylum, which was printed in 1886, adequately reflects the progress in instruction associated with the training school programs. His book contained simple data on the anatomy and physiology of the nervous system, a description of the mind and its faculties and of the diseases of the mind, and detailed chapters on the nursing care of the mentally ill person.

In spite of the growing concern about the education of the psychiatric nursing staff, it was still possible to state in 1880 that there "was not in the world a systematically organized training school for nurses in any

asylum."[6] Two years later, in 1882, the first training school for nurses in a mental hospital was established at the McLean Hospital, Waverley, Massachusetts. Shortly afterwards the Buffalo State Hospital graduated its first class of trained psychiatric nurses in 1888. Meanwhile, by 1886 the McLean Hospital had arranged a general hospital training affiliation with the Massachusetts General Hospital. The entrance requirement to the McLean Hospital training school was at least a good common school education, and the course originally extended over two years. Students received $12 monthly the first year and $15 the second year. By 1890 McLean had graduated about ninety trained nurses, male and female. Training courses were instituted in other psychiatric hospitals, notably those under the guidance of the nursing pioneers in this field, Linda Richards and Sara Parsons.

With the introduction of graduate nurses into the mental hospital nursing organization, more attention was paid by hospital administrations to raising the standards of nursing functions and to relieving the nurses of burdens which vitiated their value as active participants in the treatment of the psychiatric patient. Thus, at a meeting of mental hospital superintendents in 1886, Dr. Tuttle of the McLean Hospital stated that "We relieved nurses of a great deal of drudgery by employing on each side of the house men and women to scrub the floors, make the beds, wash the dishes and windows, and other labor that our nurses formerly did and still do."[6] There was evidence, therefore, at the end of the nineteenth century of the growing appreciation of the therapeutic rôle of the psychiatric nurse.

At the close of the century about thirty-five training schools throughout the United States were attached to institutions for the mentally ill, and about ten others were giving instruction to nurses without a regularly organized school. By this time, too, trained hospital nurses were replacing the time-honored lay matron who throughout the century had been the sometimes honest and humane but more frequently the harassing and ignorant supervisor of the psychiatric nursing staff. Eight years after the turn of the century this latter change was made compulsory in the State of New York by legally requiring in 1908 that every state hospital must have a superintendent of nurses.

The hundred years of the nineteenth century thus encompass the development of much of contemporary psychiatric nursing. Paralleling the growth of psychiatric thought, psychiatric nursing by 1900 had become an organized discipline, with its own body of knowledge and techniques,

and with its emphasis upon the nursing of the whole person. Nevertheless, it was suffused with the static custodial concepts of the psychiatric treatment of the time that it served. The task of twentieth century psychiatric nursing is simultaneously to fulfill the promise of the nineteenth century and to free itself therefrom.

REFERENCES

1. ANONYMOUS. *Flemish interiors.* London, Longmans, 1856.
2. CONOLLY, J. *The treatment of the insane without mechanical restraints.* London, Smith, Elder & Co., 1856.
3. DAMEROW, H. VON. Review of: *Ueber die Vorzüge religiöser Genossenschaften als Irrenwart-Personal.* Von Eduard König. Paderborn, Schoningh, 1854. *Allg. Z. Psychiat.,* 1855, *12,* 296.
4. Occasional notes of the quarter. Report of the committee appointed at the annual meeting of the Association to inquire into the question of the systematic training of attendants. *J. ment. Sci.,* 1890, *36,* 530.
5. Proceedings of the Association of Medical Superintendents of American Institutions for the Insane, 1853. *Amer. J. Insan.,* 1854, *10,* 70.
6. — —, 1886. *Amer. J. Insan.,* 1886, *43,* 135.
7. — —, 1890. *Amer. J. Insan.,* 1890, *47,* 166.
8. Report on state of lunatic asylums in Scotland, 1857. *J. ment. Sci.,* 1857, *3,* 548.
9. ROBERTSON, C. L. Sisterhoods in asylums. *J. ment. Sci.,* 1866, *12,* 44.
10. ZELLER, H. Houses and institutions for the insane. *Amer. J. Insan.,* 1850, *6,* 193.

PART II. NURSING PROCEDURES

EDWARD STAINBROOK AND ELVIN SANTOS

MUCH of the nursing practice in contemporary psychiatric treatment has been evolved from the fertile therapeutic thinking of the nineteenth century when both psychiatry and nursing became established disciplines in medicine. The description of the historical development of these procedures is desirable for a fundamental understanding of the rational and sometimes irrational application of such procedures in the treatment of the psychiatric patient. From historical details of the evolution of these nursing practices can be traced the development of psychiatric thought and psychiatric nursing functions from the relatively unorganized state of psychiatry which existed at the beginning of the nineteenth century to the well-developed methods of treatment obtaining a hundred years later.

Many of the historical aspects of psychiatric nursing in the nineteenth century have already been described. The slow progress towards the elimination of physical restraint in the management of the psychiatric patient was reflected in, and conditioned much of, the character of psychiatric nursing in this century. The controversy evoked by the activities

of the non-restraint reformers like Daquin, Chiarugi, Pinel, Langermann, Hill, Tuke, Conolly, and others continued throughout the century, and this concern over the use of restraints produced modifications and changes of nursing treatment procedures and, indeed, significantly altered nurse-patient relationships generally. Treatment procedures had increasingly become adjuncts to the psychodynamics involved in the psychological management of an interpersonal relationship in which one of the participants was the mentally ill patient.

In the early years of the "Asylum Period," as the nineteenth century is sometimes called in the history of psychiatry, psychologically disturbed patients, although more frequently lodged in mental hospitals than neglected elsewhere, were poorly occupied, and the problem of bed care was a difficult one. Many patients kept to their beds who in a hospital employing modern occupational and recreational therapy would have been active participants in floor groups. Moreover, the custodial viewpoint of the time dictated that the patient ought to be as little trouble as possible to the nursing staff, and putting him to bed was an expeditious method of keeping him out of the way as much as possible. Patients were thus frequently put to bed as early as four o'clock in the afternoon.

But this use of the bed greatly added to the nursing task, especially of managing the incontinent patient. The problem was also complicated by the fact that at least in the first half of the nineteenth century and particularly on the continent, the bedclothes and mattresses in use measured about two feet in depth. However, by 1860 horsehair mattresses and waterproofed sheets, usually made of canvas, were coming into common use, but, as may be seen from the *Journal of Mental Science* of that year,[17] the night nursing problems involving incontinence were still of considerable concern to mental hospital administrators. In some places the practice was to awaken, as often as four times nightly, patients who were frequent bed-wetters. In other institutions the wards were visited every two or three hours during the night and the soiled or wet sheets were changed.

After Pinel's reforms in La Salpêtrière and the Bicêtre, iron bedsteads gradually replaced the earlier wooden beds, a change which considerably facilitated bed sanitation. In La Salpêtrière, in the early part of the century, incontinent patients were put in beds made up of a mass of loose straw with a sheet stretched firmly over it with a hole in the center conducting to a copper pan in a drawer underneath the bed. Various modifications of this scheme were made in many asylums. Indeed, many

hospitals used only the loose straw improvised mattress which could be easily replaced with fresh straw. In Bethlem and other English asylums stretchers were frequently used for "dirty patients." These were made of strong canvas or sacking stretched tightly over a wooden frame.

Other methods popular in the United States about 1880[10] for dealing with incontinence included the use of atropin and belladonna for the correction of urinary incontinence, regular catheterization by an attendant every four to six hours, and the administration of water enemas just before retiring at night to prevent an untidy patient from soiling the bed.

The general construction of mental hospital beds mirrored the psychiatric attitudes of the times. Since the bed was used to constrict the activity of patients and to enforce their "safe-keeping," it was inevitable that the bed itself should be modified to be an effective restraining device. In France and Belgium an early use of the iron bed was to construct it with softly padded sides about eighteen inches in height, with one side folding down to permit easy access to the bed, a sideboard arrangement which is retained in most hospitals today for the delirious patient. However, the French psychiatrist, Dr. Aubanel, devised in 1845[2] the famous, as well as infamous, crib-bed, which was introduced into the Utica, New York, Asylum by Dr. Brigham the following year and which was referred to in this country by a critically hostile press as the "Utica crib." As Aubanel constructed it, the crib-bed was made in the form of a bunk with a convex lattice-work covering it. The lattice-work was fixed to one side of the bedstead and, like the cover of a trunk, was fastened at night, and other times as necessary, by two clasps on the opposite side. Later, Aubanel had the sides made with rungs like a baby's crib and used a hinged slatted cover. The interior of the crib was padded and was high enough to allow a certain freedom of motion to the occupant.

In 1852 Dr. William Wood[25] of Bethlem Hospital constructed a crib-bed similar to Aubanel's and apparently without knowledge of the French psychiatrist's device. Wood employed a network of webbing over the top rather than a slatted cover. However, the crib bedstead was not used in England and Scotland to any extent, even though the euphemisms, "safety bedstead" and "protection bed," were frequently used in describing the restraint-crib.

In America, however, the crib-bed was rather widely employed, one of the large American asylums having, at one time, over fifty such beds available for use. Epileptic and restless senile demented patients were the usual candidates for restraint in these beds. They were also used in the

management of delirium tremens and puerperal mania. An editorial in the *Alienist and Neurologist* in 1880 referred to the "Utica bed" as "a means of restraint and safety far more protective and humane than the hands of attendants." In spite of such approval the crib-bed had almost completely disappeared from American psychiatric institutions by 1890.

But restraint in the nineteenth century was accomplished by other means than the crib-bed. Even though the literature of the middle part of the century contained a great deal about non-restraint reform, there was considerable use of the "spenser" (straitjacket), the muff, the tying of hands behind the back with a handkerchief, the use of strong clothing and side-arm dresses amounting to a modified straitjacket, and other restraining devices. Germany was much slower in the acceptance of non-restraint principles than England and America, and, indeed, it was not until 1860 that Brosius translated Conolly's *Treatment of the Insane without Mechanical Restraints* into the German language and that he himself instituted non-restraint management in the private asylums on the Rhine of which he was the director.

However, it is probably to German psychiatry that we owe the introduction of the cold wet pack as a method of treatment for the excited patient. In the English professional literature, Dr. Lockhart Robertson is given the credit of being the first to introduce into asylum practice the wet sheet pack which he described in 1860,[16] but the German psychiatrist, Engelken, had referred to "enveloping patients in wet linen sheets" in a publication in 1846.[8]

Early in the century, and previously, a dry packing had been used for purely restraint purposes and may very well have been the direct precursor of the straitjacket. In this procedure the patient, wearing only a night dress, was laid upon a strong sheet or counterpane with his arms at his sides. The sheet was then wrapped firmly around the body and then was fastened by being sewed up, from neck to feet, with stout thread. Two bands of broad webbing were then passed, one across the chest and shoulders and the other across the knees, and tied underneath the bedstead to prevent movement.

The wet sheet pack, however, originated from the sedative use of the cold bath. In order to prolong the reaction of the cold water bath, a dripping wet sheet was thrown over the patient after such a bath and then he was rubbed down with the sheet. A variation of this procedure was to pour two or three pails of cold water over the patient, the "cold affusion" treatment, a sheet then being used in order to preserve the

effect by soaking up and retaining the water. The wet sheet pack was, therefore, developed as a method of intensifying the sedative effect of the cold water bath and "affusion."

Robertson[16] gave detailed instructions for using the cold wet sheet pack. A folded blanket was placed on a piece of macintosh which lay directly on the mattress. An ordinary sheet wrung out of cold water was placed on the blanket, the patient placed on the sheet, the sheet and blanket folded over the patient and three or four blankets were placed on the patient who was usually left in the pack for an hour and a half at a time. The French psychiatrists of the time, however, although they viewed the wet pack with favor, initially kept the patient packed for only half an hour at a time. When the patient was taken out of the pack, he was rubbed down with a dripping cold wet sheet and, if necessary, replaced in the pack. Sometimes a "cold affusion" was used during the change. The state of the pulse guided the length of treatment and patients suffering from acute mania were frequently kept in the pack throughout the day. In 1860 the cold pack was discovered to be especially valuable in the treatment of delirium tremens. But Robertson observed that the continued use of the wet sheet pack for several weeks sometimes resulted in boils or skin eruptions. The cold wet sheet pack rapidly became and remained a standard treatment procedure in psychiatric nursing.

Wet sheet packing, however, is a relatively recent variation of methods of applying cold water which have a long history of hydrotherapeutic use in the treatment of psychiatric disease. Cold water was used in very early times and was rationalized by the Hippocratic conception of phrenitis—the postulation of an inflammation of the brain as a cause of some mental disorders, so that, as in the nineteenth century when the "cerebral congestion" theory of excitement also had many adherents, the cold water was considered to "cool the heat" and so to allay the excitement. For the same reason, Chapman[7] in 1865 recommended the placing of ice-bags along the spine to "diminish energy, decrease heat, relieve congestion" and hence to restore normal balance to the "excited" vascular system. Ice applied directly to the head was motivated by somewhat similar considerations of taking the "heat out of the head" and reducing the assumed "congestion."

Cold showers and douches were also considered useful in neurasthenic, depressive, and stuporous conditions for their value in stimulating the skin. Many psychiatrists of the nineteenth century, even as late as

1870, felt that the failure of the skin to transmit sensory impressions to the brain was a characteristic of many forms of mental illness, especially of the depressive and stuporous reactions. Cold water was therefore applied to the skin as one of several methods of stimulation.

The nineteenth century used many other methods of cold water application. In the early part of the period, forced bathing, of which one variety was the "plunge bath," and the "bath of surprise" were rather commonly employed. Forbes Winslow[24] felt it necessary to castigate the use of forced bathing as late as 1857. "Have our readers any idea," he asks, "of what a plunge-bath is? . . . A violent and excited patient is taken forcibly by his legs and plunged headforemost into an ordinary swimming-bath. He is not permitted the use of his limbs when in the water, but is detained there, or taken out and plunged again into the bath until the required effect is produced."

There were many variations of the "bath of surprise." The general plan was to construct a reservoir of cold water into which the patient would either suddenly fall or be precipitated. In 1827 Guislain spoke of a plan whereby the patient was "dropped into water and caught in a net." He considered this dangerous, however, and advocated the construction of a bridge over deep running water in the center of which was an edifice of iron, formed like a "Chinese temple." The cage could then be released to fall with the patient into the water. Earlier, patients had actually been tied to ropes and dragged through a river, and sometimes patients were put into a pitch-dark room and as they hunted a way to escape would inevitably fall into a large cistern of water.

Such procedures, however, were generally replaced very quickly in the century by the douche and the shower bath, which were simpler measures and which also served the existing therapeutic need for the induction of "cold shock" reactions in the treatment of patients.

The douche (dowse or dash) is referred to by Burton in *The Anatomy of Melancholy,* who mentions its use by the Greeks. Burton says the patients were "bucketed." In one form of such treatment, which survived until fairly late in the century in the form of "cold affusions" and which was related, as suggested earlier, to the evolution of the wet sheet pack, cold water was poured slowly over the head until the patient began to shiver. Harrington Tuke,[23] the Englishman who made a rather comprehensive survey of the use in 1847 of warm and cold baths in the treatment of mental disease, recommended "cold affusions" as being useful in "hysterical mania" and observed that the leading French psy-

chiatrist of the early nineteenth century, Esquirol, also spoke highly of such treatment.

The douche, however, was generally implemented by force, either by being directed from a distance at the patient or by being sprayed upon him as a shower "dowse." Guislain, for example, placed the patient in a tub with a cover fitting around his neck and a stream of water, sometimes from a height of twelve feet, was directed at him. Pinel and Esquirol did not favor this procedure, and Pinel developed the forerunner of the shower-bath treatment by constructing a tube ending in a rose-like spray (the "douche en arrosoir"), as a method for showering the patient with cold water. Esquirol employed Pinel's shower-douche and thought that its calming effect was produced by "shock" and "cooling." The cold shower treatment came to be widely used by the middle years of the century; then the use of the procedure waned and was generally subjected to the same charge that Daniel Tuke directed in 1854[20] against German psychiatrists who, he said, employed shower baths and the cold water douche excessively as a substitute for restraint and punishment. Bucknill,[5] too, used Moreau's[14] observation, that in the German asylums "pains had been taken to isolate the (treatment) rooms so that the cries of the patients may not be heard outside," to emphasize the undesirable nature of such treatment. Earlier, interestingly, Leuret, in his *Le Traitement Moral de la Folie,* made the fear of cold water a part of his "moral treatment" of mental disorder.

According to Harrington Tuke, Esquirol stated that the cold water "douche en arrosoir" often "calmed the fury of a maniac," but Tuke himself observed that the warm bath "will calm the fury of a maniac or sooth the anguish of the melancholic." Indeed, in Tuke's survey of hydrotherapeutic procedures in psychiatry, he found that both warm and cold baths were being used in the treatment of mania and melancholia, but that baths of either temperature were used less frequently in melancholia than in mania. Because of the "stimulating" effect of the cold shower, this procedure was preferred by many psychiatrists of the time in the treatment of apathetic and depressed reactions although, as indicated, the prolonged cold shower was frequently used in the treatment of excitement and mania because it induced a "shock" reaction, and a "depressing" effect was noted by Conolly and others as occurring from its prolonged or repetitive use. For the treatment of mania, Tuke advocated a combination of the warm bath with a cold "dowse" or an ice-cap to the head, thus joining an empirical observation on the sedative effect of the

warm bath with a theory, appropriate to the physiological conceptions of his time, on the cause of excitement as abnormal heat and congestion of blood in the brain.

One of the very early uses of the warm bath is ascribed to the legendary seer and physician, Melampus, who was also the reputed discoverer of the herb melampodium, a variety of hellebore. According to some accounts, Melampus treated both mania and melancholia successfully by the administration of hellebore and warm baths.

Short warm baths have had a continuous history of being used for their relaxing effect, quite apart from their rôle in the development of habits of cleanliness. The intensification of the sedative effect of the warm bath, however, was introduced as a definite procedure by Pomme, a French doctor of the eighteenth century, who was one of the first physicians systematically to employ the prolonged warm bath. French psychiatrists of the first half of the nineteenth century quickly revived the procedure and it was used extensively not only in France but by psychiatrists in most countries throughout the century. By 1900 the famous and influential German psychiatrist, Emil Kraepelin, was a steady advocate of the prolonged bath.

In France the temperature of the prolonged bath was usually kept at about 85 degrees, although this ranged as low as 68 degrees. Daniel Tuke[21] in 1878 says the English were very cautious about the length of time to bathe the patient and he felt, after making a tour of French asylums, that the English hospitals used too warm water. But the French also had their difficulties with reactions to the prolonged bath as may be seen from Falret's suggestion, quoted by Tuke, that the patient should be fed while in the bath to prevent fainting. In some cases no cover was used over the tub; in other situations a piece of wood which allowed an opening for the patient's head effectively kept the patient in the tub. A sheet of metal was sometimes similarly used, and canvas finally became the most preferred material for tub covering. The canvas cover was immediately abused as a restraining device and has continued to be so used even at the present time.

There was considerable difference of opinion about the duration of a prolonged bath. Earlier, Pomme had treated mania by daily warm baths of eight hours' duration, although he sometimes kept patients in the bath for as long as twenty-four hours. Marcé, a French psychiatrist of the nineteenth century, who thought the prolonged bath was the best treatment for recent attacks of acute mania, objected to more than

a four-hour period, but a well-known French contemporary of Marcé, Brierre de Boismont, in a paper read before the French Academy of Sciences in 1848,[4] felt that the duration of the bath should be from ten to twelve hours, and he remarked that if necessary the bath could be prolonged from fifteen to eighteen hours. In the last decade of the nineteenth century the shorter period of a few hours daily for restless, agitated, depressed patients and the longer duration of many hours daily for the excited patient became the customary procedure.

A considerable portion of the psychiatric literature of the nineteenth century is devoted to the problem and technique of what was frequently and pedantically called "forced alimentation." Since many medical men believed that the refusal of some mental patients to eat food was not really a therapeutic problem but only evidence of culpable perversity, there was considerable argument about the advisability of forced feeding. Nevertheless, there was a growing conviction of its need in the treatment of the food-refusing patient.

The methods of "forced alimentation" existing in the beginning years of the century were actually methods of force. Conolly, in his clinics at Hanwell, used to display a metal instrument employed to open the mouths of patients, which consisted of two plates of iron which were slowly but inexorably separated by a screw. Commonly, the "spouting boat" was used and was driven like a wedge into the mouth, causing many patients to lose their front teeth, according to Haslam in his *Observations on Madness.* Haslam himself introduced an iron bit with a handle for manipulation and a hole in the center through which liquids could be poured after the bit was gotten into the mouth. A funnel was frequently used in a similar manner, and forced feeding by funnel survived as a method for at least the first fifty years of the century. A description from Haslam gives a graphic detailing of the general method of these procedures: "The manner in which this compulsory operation is performed consists in placing the head of the patient between the knees of the person who is to use the instrument; a second assistant secures the hands (if the strait-waistcoat be not employed), and a third keeps down the legs. The nose of the patient is held by the person who uses the instrument."

Although Haslam suggested that the mouth of a resisting patient might be opened for the insertion of the feeding instruments by "tickling him with a feather or by giving him a pinch of snuff to cause sneezing," the task of forced feeding remained quite formidable until Esquirol[3]

suggested that a catheter through which liquid food could be poured might be introduced into the esophagus by way of the nostrils. Two French surgeons, Dubois and Marat, carried out Esquirol's proposal but were not too successful because the catheters they used were too stiff and of too large a calibre. The French psychiatrist, Ferrus, then began to use a small diameter, gum-elastic catheter with acceptable success. Another French alienist, Baillarger, used whalebone and iron stylets inside the catheter in order to guide it into the esophagus. Initially the tube was not introduced into the stomach, and Brierre de Boismont did not allow it to pass even into the esophagus but, by holding the patient's mouth and nose, made him swallow the liquid deposited into the posterior pharynx.

After Sir Astley Cooper demonstrated the stomach pump in Guy's Hospital about 1820, the popularity of tube feeding gradually increased in England and America, but tube feeding procedures were generally employed on the continent before they gained acceptance in the United States and Britain. By 1857 Harrington Tuke[22] was introducing through the nose into the stomach well-oiled catheters into which liquids were injected either by a syringe or by a bladder. Both food and medicine were fed by this procedure.

The resistant patient was earlier put into a straitjacket as a prelude to tube feeding. The French also used the covered prolonged bath as an effective restraining device during the forced feeding. Chloroform was often used after 1850 as was ether. Subsequently, with the increasing employment of the cold wet pack, the actively disturbed patient was tube-fed, as now, while in the pack.

Initially the tube feeding procedure was almost exclusively administered with the physician as the main operator. This was especially necessary since the early methods were attended by frequent accidents of getting the liquid food into the lungs. As tubes were better adapted to their use in feeding and as suitable caution in their management was developed, the procedure was given over entirely in many places to the nursing staff. In 1889, for example, at the Buffalo State Hospital, four out of the five women on tube feeding were fed by attendants.

"Rectal alimentation" was another method of sustaining the nutrition of a patient refusing food. This procedure was rather frequently employed in England especially and was popular until nearly the end of the century. Needham,[15] for example, administered enemata of strong beef tea (one pound of beef to one half pint of water) and one half ounce

of brandy four to six times daily. In such procedures, the tube was introduced well into the colon. Adequate knowledge of the physiology of the colon being lacking, the food selected for such enemas was frequently most unsuitable for colonic absorption.

The popular English psychiatrist of the nineteenth century, Henry Maudsley, described the growing use in the last half of the century of sedative and hypnotic drugs in psychiatric treatment as the employment of "chemical restraint." Before 1850, ether and chloroform were being used in the treatment of psychiatric patients, and some of the later variations of ether narcosis were approximations of the "prolonged sleep" treatment of the present century. Opium, too, was frequently used, Engelken[8] in Germany being an especial advocate of this sedative. It was given in initial doses of one to two grains and then increased to three or four grains morning and evening. Tincture of opium was used in progressively increasing doses and was found to be valuable in the treatment of "hypochondriacal melancholia" of the involutional period. By 1860[13] morphine was being administered by subcutaneous injection. Hyoscyamine was also a favorite quieting medication.

In the last thirty years of the century, however, "chemical restraint" may have been said to have been abused. Chloral hydrate came into widespread use during this time, and in 1882 Cervello in Italy first introduced paraldehyde into medicine. Paraldehyde also had wide application as a sedative and hypnotic, and German psychiatrists very shortly after its discovery began to use it in the treatment of delirium tremens. Paraldehyde suppositories, compounded of paraffin, were being used in 1885, and chloral hydrate was being administered by enema to control epileptic seizures. Bromide compounds, too, were available. Alcohol in its various forms continued to be a favorite hypnotic and depressant in spite of the presence of other suitable pharmacological substances.

At the end of the century considerable criticism against the existing practice of allowing the use of sedatives and hypnotics as a relatively unsupervised nursing procedure was frequently found in the literature. Dr. Hitchcock,[9] for example, addressing a meeting of the British Medico-Psychologic Association in 1899, said: "At almost every asylum with which I was connected before I went to York I have seen two 16-ounce bottles made up for the males and females, given night after night to be used at discretion for patients who were noisy. I have seen this most detrimental treatment pushed until many patients have been at death's door." In this country the first female physician to be appointed to the

staff of the Cook County Insane Hospital reported[11] in 1885 that "in each ward was kept a bottle of whiskey and a bottle of strong sleeping medicine of bromides and chloral which attendants dealt out at their discretion." Interestingly, she also insisted: "That the attendants, both male and female, helped themselves quite largely from the ward whiskey bottle, which was filled whenever they desired, is beyond doubt."

However, "chemical restraint," despite the early errors and excesses in its use, was an important development of nineteenth century psychiatry, and the present nursing procedures concerned with the administration of sedatives, hypnotics, and prolonged narcotics have their historical basis in this period.

There were several other procedures in the psychiatry of the nineteenth century which merit passing scrutiny in relation to nursing practice, the use of seclusion in the management of the mental patient being one. Throughout the century seclusion was a touchy subject in psychiatry, especially during the active period of the non-restraint reforms, because it lent itself so easily to the criticism of being merely physical restraint and punishment. That it was not constantly so regarded, however, may be seen from an article in the *London Quarterly Review* of April, 1857. There, describing the "furious maniac who arrives at Colney Hatch in a handbarrow, bound with ropes like a frantic animal," the author goes on to write: "The ropes cut . . . kind words are spoken to him, he is soothed by a bath, and if still violent, the padded room, which offers no aggravating mechanical or personal resistance, calms his fury, and sleep, which has so long been a stranger to him, visits him the first night which he spends in the dread asylum."

At the beginning of the nineteenth century, Amard, in his *Traité Analytique de la Folie et des Moyens de la Guérir* (Lyon, 1807), advocated putting patients into a somber room when they were excited, and a little later, Heinroth, in 1818, also treated maniacal patients by placing them alone in a dark room to reduce the amount of environmental stimulation to which they should be subjected. Later, in the midcentury, Conolly referred to the use of the padded room, or "cell," as an acceptable temporary management of excitement, and the padded room became a common method of treatment in the majority of English psychiatric hospitals during the century.

In most hospitals seclusion had to be reported in the case records but was frequently ordered at the discretion of attendants. At the end of the century seclusion was used chiefly in the management of epileptic, maniac,

and paretic excitements. The attitude of late nineteenth century psychiatry towards the practice of seclusion was very well expressed by the aphorism of Campbell[6] who in summarizing the uses and abuses of seclusion remarked in 1886 that "It is better to live alone than to die in company." Increasingly the earlier meaning of seclusion as a penal "solitary confinement" gave way to the meaning of seclusion as "temporary separation" for the individual treatment of the patient and for the management of the social behavior of the group of which he is a part.

Blood-letting as a treatment in psychiatry had a long history prior to the nineteenth century. In the sixteenth century Paracelsus wrote: "What avails in mania except opening a vein? This is the real secret. Not camphor, not sage and marjoram, not clysters, not this, not that, but phlebotomy." There were many earlier examples of this treatment, some accomplishing it by direct opening of the vein, others, by the use of leeches. Blood-letting, along with such subjects as phrenology, was still being seriously discussed in the 1850 textbooks of psychiatry. In 1840, at the Mt. Hope Retreat in this country, large blood-lettings to the amount of thirty to forty ounces performed in standing, sitting, or recumbent postures were recommended in acute mania to be followed by local bleeding by twenty or thirty leeches placed on the temples. This was characteristic of the treatment of this time in many countries, and bleeding as a therapeutic procedure survived in one form or another until the end of the century. Heinrich Schüle,[18] for example, in Ziemssen's 1886 handbook on therapy recommended for mania no actual bloodletting, but he nevertheless advised the application of leeches behind the ears.

Contrastingly, in 1875 much attention was devoted in several Italian asylums to the transfusion of blood as a means of treating melancholia and cachexia. Earlier, transfusions of blood had been advocated in 1667 by Denis in Paris and by King in London as well as by Ettmüller (1644-1683), the professor of medicine in Leipzig, who advised blood transfusions for psychoses of psychogenic origin. Some of the nineteenth century Italian physicians used defibrinated human blood and others allowed the arterial blood of a lamb to flow directly from the animal through an elastic tube into the vein of the patient. Some patients were said to have improved, but the treatment was short-lived because of the transfusion reactions which occurred.

The electrotherapeutic procedures of various kinds frequently used in nineteenth century psychiatry have been described elsewhere.[19]

At the century's end the psychiatric nursing procedures considered

as essential knowledge for the psychiatric nursing staff were most succinctly detailed in a practical syllabus published in 1900 by the Scottish Division of the British Medico-Psychological Association.[1] According to this program the training of psychiatric nursing personnel should include "wards and sick room, bed and bedding, food and feeding (arrangements for forcible feeding), washing and bathing, clothing, observation and recording of symptoms (including pulse, respiration, temperature, excreta, charts, day and night records), administration of medication and remedies, use of moist and dry heat, cold, counter-irritation (poultices, fomentations, wet compresses, wet packing, cold water dressings, application of ice, dry heat, mustard plaster and leaves, blisters), bandaging, disinfection, accidents and emergencies, and helping, lifting, and carrying the sick."

At the end of the century there existed, therefore, a definite body of knowledge and specific skills and procedures constituting the special discipline of psychiatric nursing. It has been the aim of this study to describe the evolution and development during the nineteenth century of most of these procedures.

REFERENCES

1. ANONYMOUS. *Syllabus of practical work at Roxburgh District Asylum.* Review in: *J. ment. Sci.*, 1900, *46*, 383.
2. AUBANEL. Letter to Baillarger. *Ann. méd.-psychol.*, 1843, *2*, 469.
3. BLANCHE, M. E. ***Du cathétérisme oesophagien chez les aliénés.*** Paris, 1848.
4. BOISMONT, B. DE. De l'alimentation forcée des aliénés. *Ann. méd.-psychol.*, 1848, *12*, 429.
5. BUCKNILL, J. C. Review of: Tuke, D. H. *On the progressive changes which have taken place since the time of Pinel in the moral management of the insane, etc. J. ment. Sci.*, 1853-55, *1*, 156.
6. CAMPBELL, J. A. Remarks on the use and abuse of seclusion. *J. ment. Sci.*, 1886, *32*, 351.
7. CHAPMAN, J. Neuropathy, or vaso-motor therapeutics: a new method of treating disease through the agency of the nervous system. *J. ment. Sci.*, 1865-66, *11*, 32.
8. ENGELKEN, F. *Beiträge zur Seelenheilkunde.* Bremen, 1846.
9. HITCHCOCK, S. Autumn meeting of the Northern and Middle Division of the Medico-Psychological Association, 1899. *J. ment. Sci.*, 1900, *46*, 83.
10. HURD, H. M. The minor treatment of insane patients. *Amer. J. Insanity*, 1883-84, *40*, 205.
11. KIERNAN, J. G. American problems in psychiatry, illustrated by a study of Cook County insanity statistics. *J. ment. Sci.*, 1887, *33*, 190.
12. LINDSAY, W. L. The protection bed and its uses. *Amer. J. Insanity*, 1879-80, *36*, 404.
13. M' INTOSH, W. C. On the subcutaneous injection of morphia in insanity. *J. ment. Sci.*, 1860-62, *7*, 407.
14. MOREAU, J. Notes sur les établissements d'aliénés de Siegburg, Halle, Dresde, Prague, Berlin, et Vienne. Réflexions sur la médecine psychiatrique en Allemagne. *Union méd.*, 1854. Abstr.: *Ann. méd-psychol.*, 1854, *11*, 615.
15. NEEDHAM, F. On forced alimentation. *J. ment. Sci.*, 1879, *25*, 19.

16. ROBERTSON, C. L. On the sedative action of the cold wet sheet in the treatment of recent mania, with cases: a contribution to the curative treatment of mental disease. *J. ment. Sci.*, 1860-62, *7*, 265.
17. ———. Some results of night nursing; etc. *J. ment. Sci.*, 1860-62, *7*, 391.
18. SCHÜLE, H. Klinische Psychiatrie. Specielle Pathologie und Therapie der Geisteskrankheiten. *Von Ziemssen's Handbuch der speciellen Pathologie und Therapie.* Vol. 16. Liepzig, 1886.
19. STAINBROOK, E. The use of electricity in psychiatric treatment during the nineteenth century. *Bull. Hist. Med.*, 1948, *22*, 156-177.
20. TUKE, D. H. *On the progressive changes which have taken place since the time of Pinel in the moral management of the insane,* etc. London, Churchill, 1854.
21. TUKE, D. H. A few notes on lunacy in France, suggested by a recent visit to French asylums. *J. ment. Sci.*, 1878-79, *24*, 444.
22. TUKE, HARRINGTON. Observations on the treatment of insanity when refusal of food is a prominent symptom. *J. ment Sci.*, 1857-58, *4*, 27.
23. TUKE, HARRINGTON. On warm and cold baths in the treatment of insanity. *J. ment. Sci.*, 1857-58, *4*, 532.
24. WINSLOW, F. Prolonged shower-baths in the treatment of the insane. *J. psychol. Med.*, 1857, *10*, 1.
25. WOOD, W. Description of a new bed and bedstead for the use of insane and other patients. *J. psychol. Med.*, 1852, *5*, 395.

Agitation for Public Health Reform in the 1870's

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Part II

The National Board of Health of 1879

BY the 1870's most sanitarians were in agreement that a sound public health program could not be effected by local control and private efforts alone. The authority and support of the government were also needed. By bringing pressure to bear on state legislatures for better health laws, the American Public Health Association, founded in 1872, contributed its part toward obtaining such support on the state level. Many individual members of the Association went even further. They advocated Federal health legislation, and wanted the Federal government to create a national health agency to supervise and co-ordinate all state health programs.[1]

However, it was the yellow fever epidemic of 1878 that more than any other factor led to the creation of a national board of health in 1879. From one point of view, epidemics might well be considered savers of lives, not destroyers.[2] Nothing pertaining to health excited the minds of the people so much as an epidemic, or stirred them into action more quickly. Arguments for health reform based upon the ravages of endemic diseases, which each year exacted a heavy and consistent death toll, moved them very little. Habituated to the common ailments, the public seldom became aroused concerning their effects or their prevention. A decrease in typhoid rates in Boston after the Cochituate water supply had been introduced received only mild commendation,[3] and the splendid work of the Vaccination Corps of Inspectors of New York City, which succeeded in reducing the number of smallpox deaths from 388 in the first quarter of

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[1] Robinson, F. C. Public health and the American Public Health Association. *Amer. J. publ. Hyg.*, 1909, *19*, 693; *New York Tribune*, Nov. 13, 1875, p. 5.

[2] Winslow, C.-E. A. *The life of Hermann M. Biggs; physician and statesman of the public health.* Philadelphia, 1929, p. 91.

[3] The hygiene of water. *Nat. quart. Rev.*, 1880, *40*, 74; *Mass. State Board of Health, Second Annual Rpt., 1871*, 126, 127. The introduction of new water supplies in thirteen Massachusetts cities in the early seventies better than halved typhoid mortality. See Rafter, G. W., and Baker, M. N. *Sewage disposal in the United States.* New York, 1894, p. 18; also Waring, G. E. *Sanitary drainage of houses and towns.* New York, 1876, pp. 20-21.

1872 to five in the same period in 1877, won little more than polite applause.[4] Typhoid, scarlet fever, smallpox, and typhus were never idle in the large cities of the seaboard, and the conditions favorable to their presence were even more acute in the new, sprawling cities to the west. Even though most enlightened citizens agreed with the sanitarian that the virulence of these diseases could be tempered by sanitary reform, nevertheless progress in this direction remained exasperatingly slow. Even less attention was paid to consumption and diphtheria, two diseases that claimed more lives year after year than any epidemical infection.[5]

Familiar afflictions soon produce their own anti-toxic stoicism. The pock-marked face had always been a part of human existence. Seemingly men had resigned themselves to the thought that such disfigurement must always be borne by the race, and even the well-founded hope of deliverance by vaccination penetrated their century-old inertia but falteringly. Epidemics were cut from different cloth. Dramatic in their effects, they called for counter-measures that also were dramatic. These spectacular and mysterious scourges awakened first panic, then combativeness. Man's immediate reaction was to close the door through which the epidemic had entered, even though the damage had already been done. It can truly be said that an epidemic or the threat of one inspired most of the health legislation enacted during the first half of the nineteenth century.[6]

Of all epidemic diseases, the two main offenders in America were cholera and yellow fever. The former ravaged the nation for the first time in 1832-1834, when it leaped the Atlantic Ocean and travelled west across the continent, sparing hardly any village or community. In many localities more than 15 per cent of the population fell victims to its death-dealing powers.[7] In 1849 it paid a return visit, then again in 1854 and 1866, each visitation milder than the preceding one. Its last return to these shores in epidemical proportions took place in 1873.[8] In the 1866

[4] *New York Tribune,* April 14, 1877, p. 2. New York City employed during the summer months from twenty to eighty inspectors who conducted a house-to-house canvass and who vaccinated all persons that could be persuaded to submit to it. The results of this program became immediately discernible in decreasing mortality rates. See Harris, Elisha. Health laws and their administration. *J. soc. Sci.,* 1870, no. 2, 179, 182; *New York Tribune,* Sept. 2, 1876, p. 2.

[5] *Tenth Census of the United States, 1880, Mortality and Vital Statistics, 12,* Pt. 2, pp. xxxix, lviii.

[6] Abbott, S. W. *Past and present condition of public health and medicine in the United States.* Boston, 1900, p. 14; Shryock, R. H. Origin and significance of the public health movement in the United States. *Ann. med. Hist.,* 1929, *n.s.1,* 646, 656.

[7] Chambers, J. S. *The conquest of cholera.* New York, 1938, p. 286.

[8] See Woodworth, J. M. *Cholera epidemic of 1873 in the United States. House Executive Documents,* 43rd Cong., 2nd Sess., 1874-1876, *13,* no. 95, pp. 563-682.

and 1873 epidemics the agencies recently established to protect the public health demonstrated their worth. Had it not been for the efficient management of the Metropolitan Board of Health in 1866, founded in that same year, New York would have suffered "a most disastrous explosion of the disease,"[9] and in its travels during 1873 cholera found the large cities with their new sanitary armor a far less favorable field for destruction than smaller villages or the rural areas.[10]

From colonial times on, yellow fever had periodically invaded the mainland of North America. It was an unwelcome guest in almost half of the 185 years between 1693 and 1878.[11] The havoc it wrought was just as deadly as that produced by cholera. In 1866 it attacked the southern states at the same time as cholera and proved the more formidable foe of the two. Finally, in 1878, there occurred one of the most severe epidemics of yellow fever ever recorded in the United States.[12] The disease rapidly sped up the Mississippi Valley into the states of the Old Northwest. An aroused, frightened citizenry determined that it was time something was done to prevent a recurrence of this national tragedy. The result of their determination was the establishment of a National Board of Health and the passage of a more effective Federal quarantine law.

The origins of these two acts had roots in the far past. This is especially true of quarantine, whose history parallels that of yellow fever and cholera in America. The first quarantine regulation was put into effect in Massachusetts in 1647 (or 1648). Then, as occasion arose, other states along the Atlantic coast adopted quarantine restrictions to ward off threatening invasions. In those states possessing a port of preëminent importance the administration of the laws remained centralized under the state government. In most of New England, and Massachusetts in particular, the local town boards were left to their own discretion in applying quarantine, mainly because of the bitter rivalry between ports of equal commercial importance and also because yellow fever very seldom penetrated that far north.[13]

This necessarily was an irregular, ineffectual system, a wall with many breaches through which disease could enter and spread. The desirability of introducing uniformity in quarantine methods became recog-

[9] *Ibid.*, p. 663.

[10] Chambers, *op. cit.* (note 7) p. 295.

[11] *Senate Reports*, 45th Cong., 3rd Sess., 1878-1879, *2*, no. 734, p. 2.

[12] More than 130 towns were afflicted, deaths totalled over 15,000, and the nation suffered an economic loss estimated at $100,000,000. See Garner, J. W. Federal activity in the interest of the public health. *Yale Rev.*, 1905, *14*, 186.

[13] Peabody, Susan W. *Historical study of legislation regarding public health in the States of New York and Massachusetts.* Chicago, 1909, pp. 74-75.

nized soon after the Federal government was established. Many medical men of that day urged the adoption of uniform rules as the only sensible way to prevent the importation of disease. The yellow fever epidemics in Philadelphia and Baltimore in 1793 and 1794, which were responsible for the formation of the first municipal health "committees" in the nation, also stimulated Congress to pass the first Federal legislation dealing with the public health.

Thus, in 1796, a proposal that the President be given the power to control quarantine in all ports of the nation was introduced into Congress. In the lengthy debate that followed, the commercial states of Pennsylvania, New York, and Massachusetts opposed Federal interference, while the Southern states supported centralized control of quarantine on the grounds that "epidemical diseases, imported, affect the United States at large . . . not merely . . . the city where first imported."[14] As a compromise, a resolution that authorized Federal agents to co-operate with state and port quarantine officers, but with no authority to interfere in any way, was adopted. Three years later, in 1799, Congress passed an act instructing Federal employees how to conduct themselves when helping to carry out state health or state quarantine laws.[15]

Shortly afterward, in 1800 and 1802, petitions favoring a national quarantine law were received from Philadelphia and New York City. Those two cities had been mainly instrumental in killing the measure of 1796, but they had recently become victims of epidemics without respect for political boundaries—thus illustrating the aphorism that "it makes a difference whose ox is gored!"[16] Congress, however, had now established the precedent of non-interference, so nothing was done. Apart from two abortive attempts to introduce quarantine bills in 1832 and 1859, the Federal government left the states to their own quarantine devices until after the Civil War.

As late as 1870 quarantine regulations of Massachusetts, Rhode Island, and most New England states remained a matter for decision by local authorities. New York, Pennsylvania, South Carolina, and other states more exposed to yellow fever epidemics had state control.[17] New York City adopted particularly stringent rules, although enforcement at times

[14] *Annals of Congress,* 4th Cong., 1st Sess., 1795-1796, *5,* 1356.

[15] *United States Statutes at Large, 1,* 619-621.

[16] Allen, W. H. Rise of the National Board of Health. *Ann. Amer. Acad. polit. soc. Sci.,* 1900, *15,* 57.

[17] It is interesting to observe that cholera epidemics tended to stimulate the passage of laws affecting "nuisances," while yellow fever invasions were more often followed by quarantine measures. See Peabody, *op cit.* (note 13), pp. 144, 145-151.

was very lax. Inland states, even if not confronted with the problem of barring out diseases originating in foreign parts, extended to their river and lake cities authority to exercise quarantine against water craft.[18] All states, when the epidemical spread of disease raised the question of intercity quarantine, acted with arbitrary authority against both land and water carriers and all travellers. Persons were summarily ejected from their homes, streets and whole sections of towns were blocked off, and intercourse with other infected communities was absolutely forbidden. These internal measures did not forestall the inroads of epidemical contagions, however. From the 1850's onward the necessity of a uniform quarantine system, to be enforced by the Federal government, became a vital issue to those interested in forwarding the public health movement.

In 1866, the Federal government made its first grant from the national treasury to aid the states in enforcing quarantine. Heretofore expenditures for health purposes had been confined solely to caring for the health of government employees or to the support of the Marine Hospital Service.[19] The appropriation of 1866, therefore, marks the first active step of the national government into the field of public health.

In this same year, 1866, an attempt was launched in the Senate to establish a rigid quarantine against Asiatic cholera, with the Secretaries of War, Navy, and Treasury in charge. Supporters of the plan emphasized that throughout the country there existed a "general desire" for a "uniform system of quarantine." Their opponents, who carried the day, issued dire warnings that such a measure would bring the state and Federal authorities into collision. Even more maddening to the sanitarians of that day was the argument that since cholera was not contagious but "exists in the air," to try to keep it out of the country would be like shooting arrows at the moon.[20] This reason for legislative inaction, because it could not

[18] For examples see *Report of the National Board of Health, 1885,* 307-320.

[19] The Marine Hospital Service had been established in 1798 to care for disabled or sick seamen. It built and maintained hospitals for this purpose. Although seamen contributed a small sum monthly to a fund for the maintenance of this service, the government soon found it necessary to subsidize the Marine hospitals, which according to critics in Congress were too many and built in the most inappropriate places. In objecting to the annual appropriation of a quarter of a million dollars for the Marine Service, Senator Timothy O. Howe stated that "it was a favorable mode of starting a town in the West, if it was anywhere on a stream or on a good sized puddle, to get an appropriation for a marine hospital." Even the defenders of the service had to admit that it was cheaper to send "seamen to a first-class hotel . . . than to keep them at many of our hospitals." *Congressional Globe,* 41st Cong., 2nd Sess., 1869-1870, Pt. 2, p. 1451. Officers of the Marine Service had always evinced an interest in epidemics and quarantine matters. For instances of this interest see *Annual Report of the Surgeon General of the Marine Hospital Service,* 1875, pp. 16, 143.

[20] *Congressional Globe,* 39th Cong., 1st Sess., 1866, Pt. 3, p. 2446. One senator, in jest, proposed to refer the whole subject to the ventilation committee.

be refuted effectively by medical science at that stage of its development, proved particularly troublesome. Resolutions asking for the creation of a national quarantine system were introduced into Congress in 1869 and 1871, and in 1872 a bill to establish a national sanitary bureau was placed before the Senate.[21] The latter did not meet with a cordial reception.

In 1873-1874 both cholera and yellow fever struck again, the former in the North Central states, the latter in its familiar stamping grounds of the South and lower Mississippi Valley. Immediately Congress received memorials from the cities of the Gulf Coast endorsing national control of quarantine regulations, and from the Northwest came petitions of the same tenor signed by the National Board of Trade and other important groups.[22] Under such pressure it is not surprising that the session of 1874 saw the introduction of a quarantine bill into Congress by Representative Frederick G. Bromberg of Alabama. The bill passed the House, but the Senate took no action.

Southern members had become firmly convinced that their only salvation from the yellow fever curse lay in the use of the Federal power, however reluctant they were to resort to it.[23] But northern commercial centers looked with suspicion on these efforts to hand over quarantine regulations to the Federal government. The *Journal of Commerce* sounded the keynote of these protests when it boasted that New York City could more than match the medical skill of the "three Washington doctors whom it is proposed to put in charge of the national quarantine system."[24] There was a good basis for this boast, but it could not have been defended had it been made in former years. The health officer of the New York port in 1874, Dr. S. Oakley Van der Poel, was without question both capable and honest. But he was the first man in that office "who had not caused scandal," according to the president of the city's board of health.[25] As for Boston, during the epidemic of 1866 her businessmen had sent out circulars begging shippers to bring their vessels to that port because there they would not meet with any quarantine rules to impede commerce.[26] So long as local quarantine had no superior authority to police it, competition for business between ports meant that public health was likely to be sacrificed for private gain.

[21] However, in 1872 the Secretary of War was directed to detail army medical officers to visit ports subject to yellow fever in order to ascertain the best means of prevention. *Statutes at Large, 17*, p. 396.

[22] *Congressional Record*, 43rd Cong., 1st Sess., 1874-1875, II, Pt. 5, p. 4562.

[23] *Ibid.*

[24] *J. Commerce*, May 13, 1874, quoted in *ibid.*, 4565.

[25] *Plumb. sanit. Engnr.*, 1880, *3*, 48.

[26] *Congressional Globe*, 39th Cong., 1st Sess., 1866, Pt. 3, p. 2584.

Sanitarians of the North displayed much less interest in quarantine than did their southern colleagues. In the North, where yellow fever very seldom caused extensive havoc, attention was chiefly focused on the improvement of internal sanitary conditions, and cholera, it was believed, could better be circumvented by cleanliness of person and environment than by any policy of exclusion by quarantine. More numerous and more active than their southern associates, the sanitarians of the northern states urged as the first step in a public health program better civic sanitation and the eradication of nuisances. Their lukewarmness toward quarantine can be discerned from the fact that the American Medical Association, which was dominated by northern doctors, passed resolutions in 1871 and 1872 favoring a national system of quarantine but that was the extent of their activity in this field.[27]

To the suggestion that the Federal government establish a national board of health, first broached officially in 1872, northern sanitarians turned a more sympathetic ear. Even here they proceeded cautiously, however. Both the American Public Health Association and the American Medical Association discussed the advisability of petitioning Congress for a national sanitary bureau, but finally decided that the proper time for its establishment had not arrived. In 1874 Henry I. Bowditch, chairman of the Massachusetts Board of Health, recommended that the best policy for the medical associations was "to urge the formation of State Boards of Health for each State. When that is done, and *when they have been in operation a certain number of years, and have become an organic necessity* for each state, then, and not till then, can a National Council work efficiently."[28] From all available evidence, about two of every three sanitarians were in agreement with this viewpoint.[29]

Yet five years later, in 1879, the National Board of Health was created—born "prematurely" as one of its members asserted.[30] Several factors contributed to its formation at this particular time. The 1870's was a decade of centralization of public health administration the world over —witness the comprehensive English Public Health Act of 1872, the creation of the Imperial Health Board of Germany in 1875, and the establishment of the French Commission on Public Hygiene in 1879. New engines of industry were destroying barriers of time and space, bringing together

[27] *Amer. med. Ass. Trans.*, 1879, *30*, 324.

[28] Bowditch, H. I. Report on a national sanitary bureau. *Amer. med. Ass. Trans.*, 1874, *25*, 397.

[29] For correspondence of well-known sanitarians from all sections of the country on this question, see *Amer. med. Ass. Trans.*, 1875, *26*, 303-305.

[30] Garrison, F. H. *John Shaw Billings: a memoir*. New York, 1915, p. 164.

into closer union geographical regions formerly isolated and distant. Whether or not this welding process had proceeded far enough in the United States in 1879 to justify a centralized health bureau found few questioners; it was enough that the people firmly believed that the country was now interdependent in matters of health as well as wealth. This counted for more than the constitutional argument invoked by opponents of the National Board, an argument that sanitarians instantly dismissed by pointing out that epidemics destroyed commerce, and "to say that power of Congress over commerce could not be exercised to save commerce itself would seem to be absurd."[31] Also, by now national legislation in health matters could satisfy those two necessary conditions of all Federal activity, national interest and practicability.[32]

But it was yellow fever that supplied the immediate and most cogent reason for establishing the National Board of Health. The epidemic of 1878 had not only caused untold grief and suffering through loss of life; in addition it had engendered a panic that ended in shot-gun methods of quarantine and a complete paralysis of trade. The resulting economic losses were no longer felt by only the section afflicted. Because of the close-knit economic fabric of the nation the effects reached all corners of the business world.

Those communities that formerly had opposed national quarantine, located mostly in the Northeast, began to glimpse the desirability of a regulating authority. The disclosure that the presence of yellow fever in New Orleans had been concealed by the local health board gave point to this need; local unwillingness to brand its own community as a center of dangerous infection made it imperative for public safety to have a higher authority to announce such facts.[33] And once an epidemic had started, the evil consequences of unsatisfactory quarantine by the "irresponsible boards" of every country town or crossroads, "wholly indifferent to protect the public health, but destructive of trade and prosperity, plainly pointed to the necessity for a National Board of Health."[34]

In the spring of 1878, even before the yellow fever epidemic got under way, Congress had finally passed a quarantine act, so weakened by amendments that it possessed little real power over state regulation.[35] The intention of the bill was completely nullified by the failure of Congress to

[31] Allen, *op. cit.* (note 16), p. 67.
[32] *Ibid.*, p. 66.
[33] Billings, J. S. National Board of Health. *Plumb. sanit. Engnr.*, 1880, *3*, 47.
[34] *Appletons' Annual Cyclopaedia, 1879* (New York, 1885), *19*, 466.
[35] *Statutes at Large, 20*, 37-38.

appropriate any funds to carry out its provisions. The tragic epidemic of the following months brought a changed attitude, both among the general public and in the halls of Congress. A private commission, financed largely through the generosity of a New York woman, was organized to investigate the character of the disease and to find means of preventing its spread, and a few months later Congress followed suit by appointing a joint commission of its members to study the same problem.[36] In his message to Congress in December 1878, President Hayes declared that the "public sentiment in favor of national sanitary administration," not only to control external quarantine but to regulate "the sanitary supervision of internal commerce in times of epidemics," demanded some action from the legislature.[37]

In February 1879, shortly after the Congressional commission reported that in its opinion the disease was not indigenous but imported,[38] several bills "to prevent the introduction of contagious and infectious diseases into the United States, and to establish a bureau of public health" were introduced into both houses of Congress. The bill of Senator Isham G. Harris of Tennessee, creating a director-general of health as executive officer of a bureau of health, became the focal point for debate. Strong opposition by senators representing eastern commercial interests, who objected to placing so much power in the hands of one man, blocked its passage.[39] In the last minutes of the session, however, another bill that provided for a health board of eleven members was passed.[40] A national sanitary bureau was at last an actuality.

The Constituting Act creating this "premature" board provided for eleven members: one medical officer each from the Army, the Navy, and the Marine Hospital Service, a representative from the Justice Department, and seven representative physicians from as many different states, appointed by the President. The members served without salary, although their expenses were paid.[41] Of the better known men in sanitary science

[36] For instances of the increasing popular interest in health protection and of a movement to have Congress investigate the nature of yellow fever see *New York Tribune*, Nov. 22, 1878, p. 5; Memorial for national board of health. *Boston med. surg. J.*, 1878, *99*, 609-610.

[37] *Congressional Record*, 45th Cong., 3rd Sess., 1878-1879, *8*, Pt. 1, p. 3.

[38] *Senate Reports*, 45th Cong., 3rd Sess., 1878-1879, *2*, no. 734, p. 2.

[39] Garner, *op. cit.* (note 12), p. 187; *Report of the National Board of Health, 1883*, 23.

[40] Sanitarians in general preferred that Federal control be exercised by an executive committee, with the secretary as "mouthpiece," to a one-man dictatorship. See Billings, *op. cit.* (note 33), pp. 47-48. Some jealousy of the new board was displayed by the Marine Hospital Service, which had been invested with control of quarantine in the abortive bill of 1878 and which had since 1876 been recommending a national system under its control. See *Boston med. surg. J.*, 1879, *100*, 67, 403; *Statutes at Large, 20*, 38.

[41] *Statutes at Large, 20*, 484-485.

on this first board were James L. Cabell, Stephen Smith, Henry I. Bowditch, and John S. Billings of the Army Medical Department.[42]

The duties of the new agency were purely investigatory and advisory. As one of its first acts the Board sponsored a commission of medical experts to go to Havana to study yellow fever at its source. The Board also drew up precautionary measures to be taken by state and local officials should yellow fever once again threaten to become epidemical. The *New York Tribune,* for one, expressed great doubt of the effectiveness of this second action. It did not question the sanitary wisdom of the board members, which "certainly should be trustworthy," but feared that the "cordon" around infected vessels advocated by the board would not work under local or even state supervision in this "free republic where all are officers and none privates."[43] Unless the Board was clothed with greater authority to carry out its suggestions, the *Tribune* warned, the South might again have to resort to shot-gun quarantine. To a very slight extent this was remedied a few weeks later, on June 2, 1879, when Congress enacted a quarantine act that gave to the Board its first real power.[44]

The terms of this quarantine measure required all ships arriving at a United States port to have a bill of health made out by the consul from the foreign port of departure. The National Board of Health was assigned the task of framing rules and regulations to be observed by these incoming vessels, and of publishing the weekly abstracts of consular reports on health conditions in foreign nations. But principally the Board was directed to aid the local and state health officials in enforcing local quarantine laws, and under certain circumstances to give financial assistance to states when and where needed. Upon the request of the President the Board was also empowered to make quarantine regulations where local efforts were inadequate, and when state authorities refused to execute such regulations, to detail an officer to enforce them.[45]

Almost before the board members had had time to become acquainted with each other yellow fever once more made its appearance at New Orleans. By early June it had started up the Mississippi Valley and by

[42] The homeopathy school of medicine, which had strong backing in some Washington quarters, exerted considerable influence to have one of their numbers appointed to the new agency. Tullis S. Verdi became their representative on the national health board. Verdi, T. S. Congress and homeopathy. *U. S. med. Invest.,* 1879, *n.s.9,* 403.

[43] *New York Tribune,* May 14, 1879, p. 4.

[44] The Marine Hospital Service had formerly performed these duties, and its consistently hostile attitude toward the National Board of Health can be attributed to its resentment over the transference of some of its functions to the new board.

[45] *Statutes at Large, 21,* 5-7. Power to erect quarantine buildings and other minor extensions of authority were given to the board in an act passed a month later. *Ibid.,* 46-47.

midsummer it threatened to reach the tragic proportions of the visitation of the preceding summer. Memphis, for the second time, became its chief victim. Deaths soon mounted into the thousands and half the population fled the city, much to the uneasiness of the neighboring communities to which they moved.[46]

The National Board of Health attacked the problem promptly and as best it could with its limited medical knowledge and regulatory powers. Representatives of the board, headed by John S. Billings, went at once to the center of the infection to confer with local officials and to see what measures could be taken. A system of quarantine boats on the rivers was devised, and Federal inspectors were employed to supervise and to advise local health officers. In the light of today's knowledge it may be seriously doubted whether the activities of the National Health Board appreciably abated the progress or severity of the disease. Nevertheless, the fact that such a national agency did exist and that it was taking steps to check the spread of the disease proved reassuring to the people and allayed fears somewhat.

The whole nation, as it had done the year before, extended its sympathy to Memphis, twice desolated by this scourge within two years. More useful than money or sympathy would be a "little commonsense in towns not yet attacked" and a great deal more sanitation, the *New York Tribune* had asserted after the first epidemic.[47] Memphis itself concurred in this verdict. "We've all been heroic," commented a local editor, "now we've had enough of heroism; let's have drainage."[48] In 1879 the National Board took steps to give them the drainage they wanted and needed. Some of its funds together with the sewerage expert, George E. Waring,[49] were sent to Memphis to build a drainage system. This sanitary improvement, it was thought at the time, would go far towards averting any repetition of the late calamity.

It was extremely unfortunate that the first problem handled by the Board had to be the Memphis epidemic. It was not a fair test of the Board's true worth. Without real authority to deal with interstate quarantine, it

[46] The National Board of Health first heard of the Memphis epidemic through reports in the newspapers. Since the board had decided at one of its first meetings not to give out information to the press regarding its activities, the *New York Tribune* felt this situation had its ludicrous side. *New York Tribune*, July 12, 1879, p. 1.

[47] *Ibid.*, Sept. 16, 1878, p. 4.

[48] Quoted in *ibid.*, Nov. 22, 1878, p. 4.

[49] Waring, who for long had advocated separate drains for sewage and surface waters, now had a chance at Memphis to try out his theories. Although much cheaper to install, both the construction and the system soon proved imperfect. For a criticism of Waring's installation at Memphis, see Moore, Robert. On the sewerage of Kansas City. *J. Ass. of Engnr. Soc.*, 1884, *3*, 67-75.

could only advise state and local boards on suitable procedures to adopt. Yet the public in general judged the Board by its quarantine activities in the yellow fever epidemic,[50] and considerable disappointment was expressed throughout the nation at its "halting and vacillating" policy.[51] The people longed for some dramatic action, such as isolating every case of yellow fever.[52] Few persons realized the limited powers belonging to the Board, and explanations issued by the members and others concerning these limitations[53] were more than counteracted by the false impressions fostered by Washington newspaper reporters. These journalists, by sharp and impatient criticism, tended to heighten the general misunderstanding of the character and purpose of the Board.[54]

Fair-minded observers felt that the National Board of Health had for the most part made the best showing possible with powers that were no more effective than those of a "voluntary organization of doctors and medical officers."[55] With ill-defined authority, laboring in a field where no precedents existed to guide it, the Board was forced to depend on local and state health boards to carry out any suggestions it made. In the main it received excellent co-operation from the states, which were eager to avail themselves of whatever help the National Board of Health could give.[56] Yet favorable conditions for establishing nation-wide uniformity in health regulations did not prevail, for not only were health agencies wanting in many communities, but also most existing boards were inexperienced and ineffectual.[57]

In an effort to increase the efficiency of the National Board, its friends in Congress sponsored numerous amendments to get around the states' rights stumbling block. Although influential portions of the medical profession supported these attempts,[58] those originally opposed to the Board were able to prevent any enlargement of its functions. It remained an investigatory agency, with the additional duty of instructing the public in health matters.

[50] *Amer. med. Ass. Trans.*, 1880, *31*, 452-453; *Appletons' Annual Cyclopaedia*, 1879, *19*, 467.

[51] *Appletons' Annual Cyclopaedia*, 1879, *19*, 467.

[52] Billings, J. S. National health legislation on trial. *Amer. J. med. Sci.*, 1879, *78*, 478.

[53] See *New York Tribune*, July 14, 1879, p. 1.

[54] *Nation*, 1879, *29*, 123; Waring, G. E. The National Board of Health. *Atlantic Mon.*, 1879, *44*, 732.

[55] *Nation*, 1879, *29*, 123; also *New York Tribune*, May 13, 1879, p. 4.

[56] *Nation*, 1879, *29*, 124. The health and quarantine regulations drawn up by the National Board were adopted by Illinois, Kentucky, Mississippi, New Jersey, North Carolina, Tennessee, and Texas, as well as by local boards in Georgia, Louisiana, Alabama, South Carolina, and Missouri. Dowe, William. The science of public health. *Nat. quart. Rev.*, 1880, *41*, 128.

[57] The medical profession and the state. *Scribner's Mon.*, 1879, *17*, 901-902; Billings, *op. cit.* (note 33), 47.

[58] See for example Health legislation at Washington. *Boston med. surg. J.*, 1880, *102*, 400.

To take care of this last chore the Board issued a weekly bulletin on health conditions throughout the country, together with other sanitary advice. As a source of health information the bulletin soon became indispensible to local health officials. According to one observer, its influence with the general public was also considerable, teaching the people the difference between dirt and filth, so that "instead of resting satisfied with superficial cleanliness," they began to seek "to eradicate the hidden evil."[59]

For a very short time, scarcely more than a year, that may have been true, but with the disappearance of yellow fever the public's interest in the National Board of Health quickly waned. Most persons had expected and looked for immediate results. When these were not forthcoming, the scientific investigations sponsored by the Board failed either to attract their support or to hold their attention. As early as the winter of 1879 one opponent of the Board announced with glee that the interest in a national health program had subsided, and offered as corroborative evidence the fact that eastern newspapers had paid but passing attention to the proceedings of the last convention of the American Public Health Association.[60] This neglect on the part of the newspapers was admitted by the press itself; the continuous publicity so necessary to maintain the people's interest in public health reform was missing by 1880, confessed one paper.[61]

When Congress established the National Board of Health, it also appropriated more than half a million dollars to finance the new agency. By the end of 1882 most of this sum had been used up and the Board had to ask for additional funds.[62] However, its enemies in Congress were now stronger and more numerous than its friends. In addition, the ruling sentiment in Washington was opposed to all Federal administrative agencies. Every interest in the nation thought it should be represented in Washington by a centralized board, protested one senator, whereas what was really needed was legislation repressing them instead of sustaining

[59] *Appletons' Annual Cyclopaedia*, 1879, *19*, 468.

[60] *Boston med. surg. J.*, 1879, *101*, 853-854. This writer criticized the board severely—and also sarcastically. He claimed that the board was too big for efficiency, therefore had had to delegate its powers to five men, one of whom finally made all the decisions. He also recounted several mistakes committed by the board in the yellow fever epidemic, and characterized the reports of its sanitary inspectors, with a few exceptions, as being silly and totally without value.

[61] See *New York Tribune*, Aug. 10, 1881, p. 4.

[62] In the first three years the board expended $506,216. Roughly, it was allocated as follows: $100,000 spent for maintaining a floating quarantine on the Mississippi River; $15,000 for the expenses of the Havana Yellow Fever Commission; $30,000 for special scientific investigations; $100,000 for aid to the local and state health boards of Tennessee, Illinois, Mississippi, Arkansas, and Florida. The rest went for salaries, rent, light, fuel, pay of employees, maintenance or refuge stations, etc. *Report of the National Board of Health, 1882*, pp. 45-46.

them.[63] The National Board of Health became one of the first to fall victim to this hostile attitude. Not only did Congress fail to reënact the Quarantine Act of June 2, 1879, which had automatically expired at the end of four years, but it also specifically restricted the duties of the National Board of Health to the investigation of three diseases, namely, yellow fever, cholera, and smallpox.

Before this blow fell, most of the more active and better known members of the Board had already resigned. For a few more years the Board continued to drag out a curtailed existence. In 1889 its remaining duties were transferred to the Marine Hospital and the National Board of Health became a thing of the past.

The constitutional structure of the Federal government, with sovereignty over public health vested in the states, prevented the founding of an efficient or authoritative board. The agency created in 1879 was not ideal, but it was perhaps the best that could be devised at that time. The task facing it was also most difficult. To show how wholesome food, pure air and water, and exclusion of infectious diseases could be obtained was not enough. It also had to show how these things could be secured without inconveniencing the citizen or interfering with his rights.[64]

Neither the good the Board accomplished nor the ideal it represented died with it, however. Although it did not live up to the expectations of its supporters, and though its preventive measures against yellow fever proved of small value and its medical investigations added little new knowledge to sanitary science, yet the Board left its mark on the future development of the public health program. By its example and advice it stimulated the younger cities of the West to inaugurate sanitary improvements at a time when such changes could be accomplished with comparative facility.[65] The standards it set up were a helpful guide to inexperienced members of state and local health boards. Also, the adoption of its rules and regulations by most state and numerous local boards introduced a degree of uniformity where chaos had prevailed before. A further step in the direction of co-operation was the proposal to hold a meeting of all state boards of health at Washington in May 1884 to talk over their common problems.[66]

But there was still another reason for holding this Washington meeting. It gave the state health officers an opportunity to confer with their

[63] Garner, *op. cit.* (note 12), 194. For other congressional objections to the board, see *Boston med. surg. J.*, 1880, *102*, 617-618.

[64] Billings, *op. cit.* (note 33), 47.

[65] Dowe, *op. cit.* (note 56), 130.

[66] State medicine. Concerted action by state boards of health. *J. Amer. med. Ass.*, 1883, *1*, 627.

Representatives and Senators for the purpose of urging additional national health legislation.[67] This ideal of Federal supervision of public health kept recurring year after year.[68] Some progress in this direction was made before the turn of the century. In 1890, for example, national quarantine rules no longer had to conform with state regulations, and in 1893 the first effective maritime quarantine law was passed. However, a national sanitary bureau remained the goal of most workers in public health, and periodically attempts were made to establish such a department. These schemes had to wait until the next century for fulfillment.

Apart from being born "prematurely" and without real authority, the failure of the National Board of Health can be attributed in large part to the medical ignorance of that day concerning the etiology of disease. Even as the Board was fading into oblivion, however, new medical discoveries based on the germ theory were being made in Europe—discoveries that soon were to change radically the science of sanitation and in time to revitalize and reorient the public health movement.

[67] *Ibid.*

[68] Girdner, J. H. National government and the public health. *N. Amer. Rev.*, 1897, *165*, 733-740; Doty, A. H. The federal government and the public health. *Ibid.*, 1898, *166*, 543-551; Wingate, U.O.B. National public health legislation. *Ibid.*, 1898, *166*, 527-533; also Tobey, J. A. *The national government and public health*. Baltimore, 1926, p. 374.

Benjamin Bynoe, Surgeon of H.M.S. Beagle

J. J. KEEVIL *

IN 1839 when Charles Darwin wrote: "I must likewise take this opportunity of returning my sincere thanks to Mr. Bynoe, for his very kind attention to me when I was ill at Valparaiso," he was closing the brief preface to the third volume, the "Journal and Remarks," of the official *Narrative of the Surveying Voyages of His Majesty's Ships Adventure and Beagle, 1826-1836.* . . . Subsequent editors and commentators have been unable to add to the information about Mr. Bynoe which is given in these volumes, yet his name is known to Chilean pilots in the treacherous approaches to Magellan and the waters of the Horn, and Australian coastal skippers may read it on their charts as they steam past the sunlit shores of the Gulf of Carpentaria. Island and headland, bay, river, and inlet mark Bynoe's far-flung travels, but today it is difficult to write his biography for most of the records he left us have been destroyed. In 1902 the 2,327 Medical Officers' Journals at the Public Record Office in London were examined in accordance with section 9 of the "Rules for the Disposal of Valueless Documents" Order in Council of 25 July 1882 and not a few were found to have been injured by damp and much rotted. It is possible that the *Beagle* journals were among these for none of this great series has been preserved. A lucky chance has, however, permitted the survival of the relevant Registers of Assistant Surgeons and Surgeons, which alone can now supply a brief outline of Bynoe's life.

There was nothing in his exemplary career and modest achievement to provide his contemporaries with material for so much as an obituary notice, but today an interest attaches not only to any associate of Charles Darwin but to the quality of Bynoe's long, devoted, and adventurous service which typifies the careers of so many nineteenth century naval medical officers who made their contribution to the social history of their time and often influenced the development of allied sciences. They saw something of the grandeur of the Victorian age, its imperial expansion, the rise of cities, the dominion of the seas, and many like Bynoe knew its sorrows, the convict traffic to Australia, the distress in Ireland, the precarious solvency concealed behind the drab respectability of London's yellow brick terraces.

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Benjamin Bynoe was the son of Samuel and Elizabeth Bynoe and was born on 25 July 1803 in the parish of Christ Church, Barbados, where he was baptised on 26 December 1803. The name Benjamin is frequently found in the Bynoe family which can be traced in Barbados from 1678 to the present day. There was a Benjamin Bynoe, son of William and Alice, living at Christ Church parish, Barbados, in 1715, when he was aged four; a Benjamin Bynoe has an undated memorial in St. Michael's Cathedral, Barbados, and a Benjamin Bynoe lived in Barbados during the present century. Perhaps the future surgeon of the *Beagle* came from the colony to Britain for his medical studies but his school remains unknown. Though the report of his death in *The Times* styles him M.D., his name is not to be found in the registers of any English, Scottish, or Irish University of the period. The first definite information about him in England is an entry at the Admiralty in the Assistant Surgeons' Register that he obtained his "London Diploma" on 18 March 1825. On 20 May of that year his membership was recorded at the Royal College of Surgeons of England and on 26 September 1825 he passed for appointment as an Assistant Surgeon in the Royal Navy and was placed on the books of the *Victory,* supernumerary, next day.

Four weeks after his appointment to the *Victory* he was directed to join H.M.S. *Beagle* on the brig commissioning. She was fitting out under the command of Pringle Stokes for the survey of the coasts of South America southward of the Rio Plata in company with H.M.S. *Adventure,* Captain Philip Parker King. Thus began Bynoe's association with a ship which was to be his home for eighteen years.

When Evan Brown, the *Beagle's* surgeon, was invalided in July, 1828, Captain King, as senior officer of the Expedition, appointed Bynoe acting surgeon, and when Stokes died in November, 1828, there occurred another change which was to affect him favourably. The command of the *Beagle* now passed to Captain Robert Fitzroy, popularly remembered for his remarkable barometer; to Bynoe he was a good friend, and Bynoe's new position as acting surgeon brought them into frequent contact.

During this commission, which formed the first voyage of H.M.S. *Beagle* in South American waters, the ships surveyed Patagonia, Tierra del Fuego, and the channels adjoining the Straits of Magellan and the island of Chiloe; the details are preserved in King's *Sailing Directions to the Coasts of Eastern and Western Patagonia* . . . (1832) and in the first volume which he contributed to the later *Narrative.* Bynoe took an active part in the survey and it was probably then that his name first

appeared on a chart. On 17 April 1829 he went off in the schooner, *Adelaide,* tender to the *Beagle,* having volunteered to join in an exploration of the Magdalen and Barbara Channels. He was away till 9 June, when they rejoined the *Beagle* at Port Gallant having had no loss, ill health, or accident. Geological and other specimens collected by Bynoe on this expedition are in the Geological Society's museum and that of the Zoological Society in London. On 8 December 1829 he again volunteered for a cruise in the *Adelaide* to survey the shores of the Gulf of Penas, particularly the River San Tadeo in St. Quintin's Sound, the openings behind Xavier Island, and the Guaianeco Islands where the *Wager* had been wrecked during Anson's expedition. This region has been well named by the Spaniards, the Gulf of Sorrows; it must have been sometime during these two expeditions that Bynoe's name was given to two of its most sinister landmarks—Cape Bynoe and Bynoe Island. The Cape, sometimes known as Bynoe Point, is in Lat. 47°59′ S. and Long. 75°18′ W. about four and a quarter miles northeastward of Breaksea Island. It is the northern extremity of Isla Campaña and forms the western entrance point at the northern end of the Fallos Channel which runs north into the Gulf of Penas. Some islets lying within two miles northwest of Cape Bynoe with a clear but narrow passage between were also named after him. The quality of the scene with its rocks and breakers can only be fully understood by one who has travelled those seas, but something of their terrible menace was conveyed by Captain Slocum in his description of the area named the Milky Way in his *Sailing Alone Around the World.* Bynoe Island is about two miles eastward of Mortimer Island and affords anchorage on its northeastern side to small vessels with local knowledge; it is in the approaches to the Barbara and Cockburn Channels. This last expedition continued till 4 May 1830 when they rejoined the *Beagle* at Port Famine. By the end of October that year Bynoe's first commission was over. There followed an interval on half-pay during which he lodged modestly at 7, Paragon Place in the New Kent Road, a district of London which was to be his domestic background for the remainder of his rare intervals ashore. Here he studied through the winter and spring for his examination as Surgeon, which he passed on 5 July 1831. Promotion was to be slow in coming, however, and two days later he again joined the *Beagle* for a new commission as her assistant surgeon. He may well have felt discouraged for he found himself serving under Surgeon Robert McCormick, a man already known for his ill humour and petulance, but there must have been encouragement in the

thought that the *Beagle* was once more to be employed on the duties and in the waters where Bynoe had already had such a fruitful experience. The full story was to form the second volume of the *Narrative,* written by Captain Fitzroy, and was to add a third volume to the series, this time by Charles Darwin, giving it a world-wide celebrity.

The second voyage of the *Beagle* opened a chapter in Bynoe's life which might have altered his whole future, for Charles Darwin had joined her as Captain Fitzroy's guest. The unknown young man of twenty-two, still playing uncertainly with the idea of becoming a parson, was to bring the little ship into the limelight of a publicity so great and so enduring that much of her track round the world may now be followed by the places that bear Darwin's name. His luggage included a supply of pocket books, eighteen of which were to be covered with his rough pencilled notes during the next five years, but as he viewed his tiny accommodation in the chart house and removed a drawer from a chest to allow him to lie down in his hammock he could never have dreamed that he would live to write "the voyage of Beagle has been by far the most important event in my life, and has determined my whole career."

During the autumn of 1831 the ship had been busy getting in stores for her long absence, and early in December all was ready. Her medical stores included "various antiscorbutics—such as pickles, dried apples, and lemon juice—of the best quality, and in as great abundance as we could stow away; we also had on board a very large quantity of Kilner and Moorsom's preserved meat, vegetables, and soup: and from the Medical Department we received an ample supply of antiseptics and articles useful for preserving specimens of natural history."

On 18 December Darwin, settled on board and beginning to know his companions, "dined at 12 o'clock with the Midshipmen and then with Bynoe and Stokes[1] walked to Whitson bay, the sea here presented a most glorious and sublime appearance. For nearly a quarter of a mile it was a confused mass of breakers and from the white covering of foam looked like so much snow. Each wave as it dashed against the rocks threw its spray high on the hill and wetted our faces. To perfect the scene a single man was watching from a rock to spy out any chance wreck." He was still unfamiliar with seasickness. On 22 December he went for another walk with them, a long trudge through torrential rain; the *Beagle* had sailed on the previous day but had had to put in again owing to the

[1] This was not the commanding officer but his namesake, John Lort Stokes, 1812-1885, Mate and Assistant Surveyor of the *Beagle* who commanded her for the greater part of her next commission and was promoted to the rank of admiral in 1877.

seas that Darwin had so much admired and which had since caused him so much distress. The sailors declared that a black cat must be imprisoned under a barrel ashore, for this was not the first attempt to sail, but by the 23rd conditions had improved and Darwin, Bynoe, and B. J. Sulivan,[2] the talkative 2nd Lieutenant, were having shooting "matches with the rifle for sundry bottles of wine to be paid for at the Madeira Islands." Four days later the *Beagle* sailed and as the new year opened Madeira lay to the southward; but they passed on via the Canaries to the Cape Verde Islands. Here Darwin was frequently ashore; twice he landed with McCormick, but he liked him no more than did many others in later life and when the surgeon invalided himself home towards the end of April, 1832, Darwin described it as "no loss" and a "political change." For Bynoe the change meant a return to the position he had held during the previous commission, for Rear-Admiral Baker now appointed him Acting Surgeon of the *Beagle* once more, a capacity in which he continued to serve for the remainder of her long exploration. As 1832 slipped by they moved across the Atlantic, calling briefly at Fernando Noronha and then coasting South America—Bahia, Rio, Monte Video, Buenos Aires, Bahia Blanca, Tierra del Fuego. Bynoe's anxieties increased with his responsibilities for he was without an assistant until September, 1833, when William Kent joined as his junior. Meanwhile the tropics and the antarctic had taken their toll. Within a month of McCormick's prudent withdrawal Bynoe had experience with one of those mysterious fevers which menaced ships on the African and Brazilian coasts and may now almost certainly be identified as yellow fever. It caused the death of two seamen and a midshipman Charles Musters, a son of Lord Byron's "Mary,"[3] who had gone snipe shooting in a cutter up the Macaco River and sickened on board some days later. He "consulted with the best medical advisers at Bahia, and afterwards at Rio de Janeiro and he . . . had the melancholy satisfaction of knowing that the best had been done for his patients." Captain Fitzroy later wrote that the "affectionate kindness of Mr. Bynoe on this, and indeed every occasion when his skill and attention were required, will never be forgotten by any of his shipmates."

The year merged imperceptibly into 1833 with visits to the Falkland Islands and the adjacent mainland of Patagonia, up to Buenos Aires or down to Tierra del Fuego; New Year's Day, 1834 found them at Port

[2] Bartholomew James Sulivan, 1810-1890, later Admiral Sir James Sulivan, K.C.B.

[3] Mary Chaworth Musters whose relationship with Byron is a controversial issue and is discussed in Sir John Fox's *The Byron Mystery*, London, 1924.

Desire in northern Patagonia, but now they moved through Magellan and remained in those desolate waters many months, visiting the island of Chiloe with its grim memories of so many of the *Wager's* last survivors whose names are commemorated on the local charts. In June Bynoe accompanied a boat which surveyed the St. Andrew's Channel and Sir G. Eyre's sound in Tierra del Fuego; they approached close to that oppressively magnificent series of glaciers and while standing in the boat Bynoe was able to see at one time as many as fifty floating masses of ice. He landed on one in which was embedded a great block of granite from which he chipped a specimen for Darwin, who discusses the whole matter in the third volume of the *Narrative*. But Bynoe could not absent himself for long on such expeditions, for the protracted commission and the climatic conditions in the Fuegian Channels were beginning to make inroads into the health of the ship's company. Pulmonary tuberculosis often began first to manifest itself in these expeditions shortly after leaving the tropics for colder latitudes, as can be seen in the account of Cook's and Vancouver's voyages, but its virulence in the latitude of the Beagle Channel is remarkable. Not only has it exterminated the indigenous population, but to this day adds a great quota to the suffering of the convicts in Argentina's lonely penal settlement at Ushuaia on the Channel. On 27 June 1834 the *Beagle's* purser, George Rowlett, was buried at sea after a prolonged illness which was probably phthisis. He had been Bynoe's and Darwin's companion ashore on many occasions and as he lay dying on board in the cold, misty waterways of the Horn, Rowlett may have recalled the early sunlit days of the voyage when together they had landed at Porto Praya in the Cape Verde Islands and, having breakfasted with an American merchant, "mounted our ponys" and travelled through the brown countryside to the fruitful valley of St. Martin to collect flowers and fresh water shells for Darwin. How with them he had climbed to Ribeira Grande's ruined fort and cathedral "situated at the foot of a high black precipice, through which a narrow and abrupt valley has cut its way" and admired the palms "waving their lofty heads above the dark green of an Orange grove"; or their lunch at a "venda" . . . "to see which operation a concourse of black men, women and children had collected . . . everything we said or did was followed by their hearty laughter." Or Bynoe may have reminded him of another ride in February, 1832 when the three of them had gone to St. Domingo in the Cape Verde and had lost their way in the trackless wastes of those barren hills where only

a stunted acacia relieved the tawny colouring; as Rowlett ate the now meagre rations of the *Beagle* he may have recalled the "most hospitable Portuguese, who treated us most kindly and feasted us with a most substantial dinner of meat cooked with various sorts of herbs and spices and Orange Tart," how on their return to Praya they overtook "20 young black girls dressed in most excellent taste" who when they approached "suddenly all turned round and covered the path with their shawls; they sung with great energy a wild song, beating time with their hands upon their legs," how they threw them some "vintem" which were received with screams of laughter and a redoubling of the noise of their song.

Shortly after Rowlett's death the *Beagle* sailed north along the Pacific coast and in August reached Valparaiso. Darwin visited Santiago and did much riding and climbing in the central Cordillera of the Andes southeast of the capital. He appeared to be in excellent health but it was now that there occurred the illness to which reference has already been made. On 19 September 1834 he wrote "During the day I felt very unwell, and from that time to the end of October did not recover." He had recently crossed the Andes but had not apparently suffered from mountain sickness or noted any fatigue; even after this date he was able to continue his collection of specimens till the 24th, when they turned back to Valparaiso. He records that they reached the port on 27 September and that he then remained in bed in the house of a school friend—Mr. Corfield. Darwin attributed his illness to drinking Chi Chi, "a very weak, new made, sour wine," and Bynoe treated him with Calomel.[4] He attended him ashore till the end of October while the *Beagle* was riding at anchor in the bay painting ship, storing, and taking in fresh water.

The months that followed were occupied in further cruises off the Chilean coast; on 19 July 1835 they reached Callao, the port of Lima, and in the next seven weeks were able to enjoy something of the beauty of the ancient viceregal city. But the four years in South American waters were ending and, after a visit to the Galapagos Islands, the *Beagle* sailed westward to Polynesia. Following a brief period at Tahiti, she reached New Zealand for the last Christmas they were to spend abroad.

[4] This reference is from Lady Barlow's *Charles Darwin and the Voyage of the Beagle* (1945), p. 107, and is from a letter to his sister. No better explanation of this particular illness has been offered although Darwin's health has been the subject of much critical analysis. Psychological factors played a considerable part and it was his recognition of the association between becoming "easily flurried" and developing "violent palpitations" that influenced him in his retirement to Down and the regular life he led there.

Memories of Plymouth in 1831 were already dimmed by the Christmases at St. Martin's Cove, Cape Horn, at Port Desire in Patagonia, and at anchor off the peninsula of Tres Montes on the Chilean coast. And now the *Beagle* began the last leg of her long journey home—Sydney, Keeling Island, Mauritius, and the Cape; they reached Simon's Bay at the end of May, 1836, but some months were still to pass before they dropped anchor at Falmouth on 2 October, for the course took them to St. Helena and then across to Brazil again before they continued northward past the Azores.

The *Beagle* paid off at Woolwich on 7 November 1836, and Bynoe, looking back on those eventful years may well have felt a certain satisfaction. His interest in natural history had been greatly stimulated and he must have acquired a good working knowledge of geology under Darwin, which might serve him well in the future. For the moment, however, all that opened before him was a vista of half-pay and a return to Paragon Place, where during that winter his friends heard the story of the past five years and tried to picture life in that intimate little community of seventy-six souls, frequently cut off for long periods from all human contact and with no more amusement than could be supplied by Covington, the ship's fiddler, or the minor excitements of landing for a ride or some shooting, excitements sometimes increased by the uncertainty of returning to the ship. They followed Bynoe as he described a day in October, 1832, when a party had landed at Bahia Blanca, south of Buenos Aires, and while Darwin and Captain King went in one direction to geologise, he had gone in another to shoot; how the wind came up and eighteen of them were stranded while the brig lay tossing in the bay with waves breaking over her, their supperless night ashore and breakfast consisting of some small birds, two gulls, and a large hawk which was found dead on the beach, their dinner of fish left by the tide, the cold of the second night with the wind blowing off the snows of the Sierra de Ventana, and their enjoyment of the "luxuries" of the *Beagle* when they were at last able to return. The New Kent Road seemed very safe and comfortable that night as he told the story.

Or he regaled them with tales of the three Fuegians, York Minster, Jemmy Button, and Miss Fuegia Basket, brought by Captain Fitzroy to England in 1830 for their education, and now returning in the *Beagle* to Tierra del Fuego "to enlighten their compatriots in Christian morality and the use of tools," but who could not be won from their thieving propensities and so proved a profound disappointment. Bynoe had be-

come "their most confidential friend" and it had been from him that Captain Fitzroy obtained his account of the Fuegian superstitions and his ethnological descriptions of the Canoe Indians, the natives of the western shores of Patagonia and Chiloe, as well as many details of the geology, flora, and fauna. He had generally accompanied the captain ashore for this purpose and, being a good shot, he was also employed as a scout when they landed among potentially hostile natives as well as for protection from lions and pumas. During this period in Tierra del Fuego their antiscorbutics had run low and it was under his direction that they had replenished their stock with wild celery and cranberries from the shores of the channels.

Bynoe was not left for long to enjoy domesticity or to brood on his memories and his financial difficulties; Christmas, 1836, was gladdened by the news which reached him three days earlier that, after so many years of holding the acting rank of surgeon, it was now to be officially confirmed. By the standard of the time he had been fortunate, for his relatively rapid promotion had been assisted by Captain Fitzroy who had written of him when the *Beagle* paid off that he "strongly recommended Mr. Bynoe as an Assistant Surgeon of upwards of eleven years standing, nearly the whole period of which has been employed in actual service." Sir William Burnett, the Director-General, had made a minute "I can only add to the testimony of Captain Fitzroy by strongly recommending Mr. Bynoe to the favourable consideration of their Lordships as a highly meritorious Medical Officer."

Promotion was quickly followed by an appointment to the *Beagle* as her Surgeon. On 21 February 1837 began another commission of unusual length for she was once more employed on surveying service, this time in Australian waters. Bynoe was now to apply his apprenticeship under Darwin and to combine the duties of botanist with those of medical officer. The *Beagle* was commanded by John Clements Wickham, her former first lieutenant, and John Lort Stokes was also appointed to her; when Wickham was invalided in March, 1841, Stokes succeeded him in command for the remainder of the survey. Thus throughout the long expedition Bynoe found himself not only among friends, but in a ship successively commanded by them.

When he was appointed, their date of sailing was still some time ahead and it was not till July, 1837 that they left Plymouth carrying with them to the Swan River the news that King William had died a fortnight earlier and that the Victorian era had begun.

Their route took them through many familiar waters—Tenerife, the Azores, San Salvador, Bahia, then across to Simon's Bay and so to Fremantle. After a detailed investigation of the country and coasts of western Australia the *Beagle* continued eastward, passing through the great strait whose discovery had been reported by Surgeon George Bass on 25 February 1798. After visiting Tasmania, they went to Sydney and later to the strange waters of the Barrier with their bewildering succession of indistinguishable coral islets clothed with low scrub. Then they turned south and discovered the Adelaide River, and then north to the Timor Sea. By now Bynoe had already formed a considerable collection of specimens—birds and fish, coleoptera and lepidoptera—a part of which collection eventually found its way to the British Museum (Natural History) in London. For this work Bynoe has received little credit, only one species being later named after him; the limited application of this usual courtesy is strange since among those who examined and identified the specimens at the end of the voyage was Sir John Richardson, himself a naval medical officer and explorer, and still remembered for his kindly encouragement of youth. The period in the Timor Sea was, however, to bring Bynoe a not inconsiderable memorial, for while the ship was based on Port Darwin in September, 1839, Captain Wickham examined an opening in the coast lying about twelve miles to the westward, which he named Patterson Bay, and an inner haven which he marked Bynoe Harbour on the chart. This is now known as Bynoe Bay and is on the west coast of the Northern Territory of Australia facing the Timor sea (Lat. 12°40′ S., Long. 130°35′ E.)

On this cruise Bynoe's medical and surgical skill were constantly in demand on account not only of illness, but such mischances as the spearing of his captain by natives or, on more than one occasion, because of casualties ashore through the accidental discharge of a musket. In these anxious cases he would watch all night at the patient's side and certainly earned his reputation for care and kindness.

Periodic returns to the Swan River preceded further intervals of surveying on the Australian and Tasmanian coasts and visits to Sydney, but June, 1841 found them once more in the Gulf of Carpentaria. It was here, in August, that one of the officers, Fitzmaurice, was severely wounded in the foot by the accidental discharge of a musket. Bynoe went ashore to attend him and was able to avoid amputation. Bynoe Inlet, which Fitzmaurice was surveying at the time of the accident, pays tribute to his care. It lies between the Flinders and Van Diemen's

inlets in Queensland (Lat. 17°32′ S., Long. 140°50′ E.). A large volume of water was noted by its discoverers to flow from it and they inferred it to be a river flowing into the Gulf of Carpentaria; the belief later proved correct and this river too now bears Bynoe's name.

Before the *Beagle* left Australia in May, 1843, many of its mushroom cities had had time to grow out of all recognition and the harsh penal laws had already added numberless shiploads of human freight to their population. But Bynoe little dreamed of his future association with this traffic in human life and, as they sailed back past Mauritius and the Cape Verde, thoughts of home and the disposal of the scientific collections occupied all his mind.

Among the specimens was an acacia which many years later was to bring him tardy recognition among botanists, but the high hopes which he must have entertained as Spithead came in sight on 30 September 1843 were doomed to disappointment and when in the future he looked back on the voyage, his only real satisfaction must have been that it had been achieved with the loss of only two men.

The *Beagle* paid off at Woolwich on 18 October and at this point Bynoe might well have followed the course of Archibald Menzies (1754-1842) after Vancouver's great voyage, or of the influential Joseph Hooker who had returned with the *Erebus* and *Terror* expedition three weeks before the *Beagle's* arrival, having contrived to maintain the peace with his senior, Robert McCormick, for over four years. Both these young surgeons pursued distinguished careers ashore among the Fellows of the Linnean Society, but in Bynoe's case nothing came of his long contact with research into natural history. The break was so complete that his contribution is now forgotten except for a brief entry in Britten's biographical work on botanists. The explanation for Bynoe's decision as to his future must remain speculative, but it seems probable that, in spite of his being chosen for the three expeditions of the *Beagle,* he lacked previous training in a garden. Hooker was the son of the great director of the Royal Gardens at Kew, while Menzies had graduated into botany through the famous garden in Edinburgh which in the previous century had trained William Anderson (1748-1778), who accompanied Captain Cook for the last seven years of his voyages. Bynoe was primarily a doctor and his surviving journals as well as the tributes paid him by his commanding officers indicate that it was in medicine that his true interest lay, but he may also have been governed by economic pressure which made it impossible for him to change his career at the

age of thirty-nine. Other circumstances were also acting against him. In 1548 William Turner in his *Names of Herbs* mentions only some thirty exotic trees and shrubs and any reader of Francis Bacon's essay *Of Gardens* will be impressed by the very limited range of plants and trees which were available to the Tudor and Stuart gardeners; but successive expeditions had introduced a vast variety of new genera to British horticulture and at the time Bynoe landed his specimens, there was much duplication. Interest in these matters was also diminishing as the industrial age swept forward on its triumphant progress to the Great Exhibition of 1851, and there was a loss of rich, powerful, and distinguished patronage such as that for so long afforded by Sir Joseph Banks to Anderson, Menzies, and many others. When many years later George Bentham investigated the collections of Australian flora at the British Museum he wrote in his preface to *Flora Australiensis* of the lack of funds which had prevented the one hundred and seventy plants collected by "the officers of the *Beagle* under Captain Wickham and Captain Stokes" being made available for examination at the museum. There is, however, another collection at Kew which is definitely attributed to Bynoe and there seems little reason to doubt that the "officers" alluded to above were really the surgeon himself, a view which has been adopted on the museum labels. The two collections are essentially the same, though with specimens missing here and there from one or the other, and we may conclude with some justification that Bynoe formed them both. The following letter from Bynoe to Sir William Hooker, which is now preserved at Kew, may indeed be considered to place the matter beyond dispute.

H. M. S. Beagle, Monday Mg. 9th Oct./43.

Dear Sir, I sincerely thank you for your kind letter through Mr. Gould. I hardly know whether my collection of plants would be considered an extensive one but in Ferns I have taken advantage of every opportunity that offered on the Coast of New Holland and indeed the whole collection in Plants, Birds, Shells, Spirit preparations &c were obtained for Sir. Wm. Burnett, however, as there are duplicates of most of them, no doubt I shall be able to contribute towards your Herbarium. I have some few seeds which I shall be most happy to place in your possession but as the Vessel is purposing to be paid off and in a great state of confusion nothing can be got at until Friday morning when Mr. Gould will kindly pay me a visit to look over my Birds.

I beg to remain, Yours most obediently,

BENJM. BYNOE, Surgeon

Whatever the cause of the failure to give him any credit at the time—and Sir William Burnett's myopic indifference to all that was not related

to his administrative interests may have been an important factor—the end of the *Beagle's* long voyage brought Bynoe no promise and opened no doors but that of half-pay and a once more reduced establishment. He was now a married man and he and his wife had been living at Maryland Place, Great Bland Street, off the Dover Road, but they now moved to Camberwell Place and then to Marlborough Terrace in the Old Kent Road. Before doing so Bynoe had in February, 1844 reviewed his finances and made his will in which he left all to Charlotte, his wife. So little were his circumstances to change during the remainder of his long service that this will was the one she proved twenty-two years later. Bynoe had called on Sir William Burnett in December, 1843 and asked for a ship and in this at least he was to be more fortunate than many of his contemporaries, for it must be remembered that even such successful officers as J. L. Stokes were often on half-pay for several years. On 21 February 1844 Sir William appointed him Surgeon Superintendent of the hired Convict Ship, *Blundell,* destined for Norfolk Island with convicts from Millbank prison. Perhaps the fact that he had just come from Australia may have suggested to the official mind that he was most suited to this service, but as Bynoe recalled the *Beagle's* commissioning on that day seven years before he must have contrasted the hopes then raised by the prospect of Australian exploration with the gloomy situation now before him.

Though he remained in the *Blundell* for only fourteen months, this appointment initiated a depressing series of similarly obscure ones, punctuated by even gloomier intervals of half-pay. Admittedly conditions in the *Blundell* were less degrading than those which not long before had faced naval medical officers detailed for service in a Guineaman, but the harsh conditions of the convict transports and the brutalising methods with which the men were treated must have been irksome to anyone of a kindly disposition. The picture has been too well drawn by Lord Birkenhead in *Ralph Rashleigh* to require a description here and there was certainly cause for any dejection Bynoe may have felt, not only as he viewed the Millbank prisoners but as he thought of their prospects, for he was already familiar with convict settlements through visits to Tasmania and to Botany Bay. He settled down, however, to his strange practice and recorded in his journal the limited range of illnesses that occurred on this voyage. The journal for the first part of his appointment to the *Blundell* (29.2. '44 to 1.8. '44) has survived; it is written in the clear uniform script common to all official records of the period,

but it throws light on his quality as a doctor. The first nine cases were admittedly no more than "diarrhoea" and there is much rheumatism and "obstipatio," which was frequent among the prisoners and was "attended with some degree of excitement requiring active Cathartics," but when a pistol went off and caused a "vulnus," Bynoe amputated the right index finger of the sergeant of the guard with good results; and when a case of pulmonary tuberculosis developed he recorded the daily changes and slow decline in detail. At night he would visit the prison and his note that the prisoners "behaved remarkably well and gave very little trouble" is an index to his success in handling them.

It was while Bynoe was thus employed that the clerk, who maintained his blameless record at the Admiralty, was surprised one day by the intelligence that a Mrs. Elizabeth Brown had written to Sir William Burnett demanding £23.0.3. from Benjamin Bynoe for house rent, moreover she stated that he had "treated all her applications for payment with contempt." The entry was duly made and Bynoe's absence prevented an investigation, but on 6 May 1845, four days after his return from service, Mrs. Brown's accusation was dismissed. Bynoe's reply was immediate and his explanation complete, so that by 9 May the clerk was able to close the entry with a note that the liability had been incurred by Mr. Bynoe's father-in-law and the Director-General "could not therefore interfere any further" in Mr. Bynoe's concerns. This discouraging time had been relieved by a single incident when on 26 August 1844 the Royal College of Surgeons of England had elected Bynoe a Fellow, but between leaving the *Blundell* in April, 1845 and his next appointment to a convict ship lay nearly a year on half-pay and lodging uncertainly at Marlborough Terrace and then at their old address in Camberwell Place.

Before his next ship he may, however, have been encouraged by reading his old commanding officer's tribute to him which appeared in 1846 when J. L. Stokes published his *Discoveries in Australia,* acknowledging in the preface that Bynoe had contributed to it various papers which had been dispersed in its two volumes and writing that "his personal and professional merits need no eulogium from me." The acknowledged papers included an account of the Australian aborigines at Roebuck's Bay, a discussion of the climate, and a description of marsupials; in addition Bynoe had taken the opportunity of his further visit to Australia in the *Blundell* to investigate certain outstanding botani-

cal problems for Stokes and the results were included in the published work.

His next ship was the *Lord Auckland* bound for Hobart on 19 March 1846, and a fortnight later he reported he "had arrived . . . with the Guard at Kingstown Harbour" where the majority of the convicts were to be embarked. They arrived from prison strongly ironed and chained, and on board they remained fettered; their own clothes all destroyed, they were provided with a coarse grey jacket, waistcoat, and trousers; sometimes yoked together for heavy work they had no more identity than animals; but perhaps in the sick berth they recovered something of their individual personality with the shedding of the grey uniform and the removal of the shackles, with Bynoe making no distinction between them and his patients from the ship's company and only a guard in the berth to remind them of their position. But Bynoe was not destined to minister to them for long, and in July the ship had to put in to Simon's Bay to land him at the Cape of Good Hope Hospital with pneumonia. He was too ill to transfer his stores to the acting surgeon, J. J. W. Roberts, who had joined by order of Rear-Admiral Dacres, the Commander-in-Chief, and his anxieties must have been increased by the knowledge that his failure to render a store account involved the risk of losing his full pay for the voyage. His situation was made happier though more complicated by the presence of Mrs. Bynoe in the *Lord Auckland*. The subsequent careers of King and Fitzroy may have had a bearing on this circumstance: Rear-Admiral P. P. King had been born in Norfolk Island and had returned to Australia when he retired in 1831, settling in Sydney with his family and becoming a legislative councillor. Bynoe may have considered the question of emigration to New South Wales or at least establishing Charlotte in Sydney while he was employed in convict ships. In addition to King there was the presence of Vice-Admiral Fitzroy in New Zealand to influence him, for Fitzroy had been appointed to his troubled governorship in 1843 and the news of his resignation at the close of 1845 would not have reached the Bynoes before they sailed. Or perhaps it was no more than the cumulative effects of oft-repeated and prolonged separations, or the father-in-law's debt during the previous voyage, combined with the drabness of life in the Old Kent Road, that had made Charlotte ask for permission at the last moment to accompany her husband to New South Wales. At first it had met with refusal, but Mr. Crandell of the Physicians' Department had eventually acted in Sir William's absence and permission was given.

Any dreams of the Old Kent Road giving place to a sheep station were closed, however, when with Bynoe's recovery he and Charlotte boarded the *Maria Soames,* transport, at the Cape and landed in England at the end of October, 1846. Meanwhile the *Lord Auckland* had reached Australia and Bynoe's successor was writing a very different type of report to the Admiralty from that of his predecessor. Roberts had in full measure the Victorian quality of sitting in judgment and combining piety with severity. He began: "180 prisoners were embarked, 13 English and 163 Irish, 4 Scotch; of whom 21 learnt to read, 13 to write and 20 to spell, 140 knew their Lord's Prayer Belief and Commandments and 20 learnt them on board by my orders. 157 men Catholics and 23 Protestants. . . ." He added that they were "well behaved and judiciously managed reflecting credit upon my Predecessor and praiseworthy zeal in the exertions of the Boatswain and his mates, in the selection of whom Mr. Bynoe had shewn great discernment." But the gentle regime of Bynoe was over and Roberts opened his by having two convicts flogged; when he had thus established his authority he confined himself to the weapon of ridicule which he held in high regard, shaving half the head of those who transgressed; admittedly he also gave distinguishing badges to those who pleased him, but possibly it was these rather than the transgressors whom he succeeded in embarrassing.

Bynoe had been relieved to find that his full pay for the voyage was approved in spite of his failure over the store account, but he now reverted to half-pay and the narrow life of Camberwell Place. Throughout the winter of 1846-47 he was occupied in study and on 10 February 1847 "transmitted a certificate of having performed the capital operations of surgery on the dead body under the superintendence of Professor R. D. Grainger." This had taken his mind off the gloom of restricted days and straitened means which was heightened by the constant reports in the daily press of the deplorable conditions in Ireland. The great famine was to bring him his next appointment and with it the opportunity for Charlotte to move to another featureless but more comfortable house in Albany Place in the Old Kent Road.

At the end of February he was directed to proceed forthwith to Cork "to aid in carrying out measures for the relief of the *Distressed Irish.*" The almost complete loss of the potato crop through blight in the autumns of 1845 and 1846 had caused widespread distress, which was prolonged by potato disease in 1847 and 1848. By the end of 1846 there was already a great epidemic of relapsing fever, typhus, and dysentery;

all the consequences of destitution and famine were already manifest. Sir Robert Peel, the Prime Minister, was deeply concerned as well he might be; in the end the Irish famine caused the fall of his ministry, although the government did much by introducing maize flour from America and arranging for its distribution from twenty principal food depots in Ireland. In spite of these and other measures the population fell through disease and emigration from 8,175,124 in 1841 to 6,515,794 in 1851. A picture of this terrible period has been preserved in the pages of the Reverend John O'Rourke's history and it was more carefully studied by Charles Creighton in his classic history of epidemics; the consequences can still be observed.

The relief measures included the loan of doctors, but arrangements were incomplete and, although Bynoe was desired to hold himself in readiness to go at any moment, it was not till the end of March that he was appointed, additional, to H.M.S. *Crocodile* at Cork for relief service on shore. A week later medicines were supplied to him and a "sergeant and two Privates of Marines were placed under his orders to assist as Dispensers." The relief centre was set up at Belmullet on 22 April and he was allowed 15/- a day for the expense of living ashore; this addition to his full pay was a surprisingly generous sum for the period, but the day after this was approved Mr. E. Crane of the Relief Committee wrote to Captain Hamilton, who was in charge, that not only had the *Fearless* been prevented by bad weather from bringing the expected medical supplies to Belmullet, but Bynoe was now himself sick with dysentery. By 26 May 1847 his bad state of health was causing official concern and Dr. William Smith was sent by the Admiralty to report on it. He found Bynoe barely convalescent from a further illness, a fever that had attacked him in the middle of May, but by the middle of June he was able to "take the air when the weather permitted" and two weeks later resumed duty. Within a few days, however, he had to give up the room occupied by his dispensary and although he found another, he had no authority for the expenditure of 4/- a week on the rent; he "begged to be informed how it is to be paid for." That he had not underestimated the seriousness of the commitment was shown when the problem was submitted to their Lordships, but happily the Board approved his action. His tenure of the new dispensary was to be brief for the appointment ended on 11 September and in October he was once more in London on half-pay and trying to recover his travelling expenses from Belmullet.

The Bynoes now occupied 5, Carlton Terrace, Park Road, New

Peckham in the familiar quarter in which they had lived since he joined the Navy, but two weeks later Charlotte was alone once more, her husband having been appointed surgeon of the *Ocean*. This ship had been employed as a convict transport, but her duties at this time are not recorded. There followed a long period of sea time, and memories of half-pay were at last left behind. The *Ocean* quickly gave place to the *Ganges* at Christmas, 1847, and February, 1848 brought a transfer to the *Wellington;* here he remained for nearly three years before joining the *Monarch* in which he was superseded on the 23rd of March 1851. They appear to have been uneventful years for Bynoe, though passed against a background of European revolution, with Italy in a ferment and reorientation in France, Germany, and Austria. His own peace was disturbed on only one occasion when in December, 1849 he was reprimanded for not transmitting returns or accounts for the *Ocean* and *Wellington*. The close of this tranquil period brought eight months under the shadow of half-pay with its now inevitable sequel of a change of address—this time to Northampton Place in the Old Kent Road—and he was thankful to be appointed in November, 1851 to the *Aboukir,* even though the commission was to begin alongside the prison hulks at Woolwich and involved no more than "carrying 300 males to Van Diemen's Land." Bynoe's journal for this voyage has survived and shows something of his practice among the convicts, their marine guard, the families of the guard including infants in arms, and the seamen. Two sickly children died of tabes mesenterica and one child was born, one prisoner died of advanced tuberculosis on whom Bynoe conducted a thorough postmortem examination. In general the interest of his work was, however, meagre, entries of catarrhs, "opstipatio," and diarrhoea recurring on each page. He concerned himself with seeing that the sleeping boards and all woodwork in the living quarters were washed with chloride of zinc, that vested interest of Sir William Burnett,[5] and keeping the prison deck as dry as possible by "hot air stoves passed down below twice a day" after rounding the Cape with the thermometer below 50° F.

On 22 March 1852 Bynoe reported his arrival at Hobart Town and a few weeks later was homeward bound. He was all too familiar with this uncertain type of service and it came as no surprise to him to be unemployed once more for nearly a year following his return,

[5] Sir William Burnett patented in 1838 a disinfectant fluid containing zinc chloride.

but the autumn of 1853 brought an appointment to the *Madagascar*. Charlotte was now able to return to their more comfortable quarters at Carlton Terrace, but she was increasingly worried about her husband's health and had hoped for something with greater promise for him than the receiving ship at Rio. After much hesitation and with some misgiving she decided on 7 November 1853 to send a letter to Sir William Burnett. Anxiously attentive to the choice of agreeable phrases she wrote:

> I beg to apologise for troubling you on this occasion but from the great kindness I have always received from you, I venture to do so. My Husband was most anxious to obtain an Appointment, and you kindly gave him the Madagascar, he did not at the time know exactly what the appointment was, nor did he like to tell you he thought it was not quite so good as he might have expected from his long Servitude. He feels convinced that it is an arduous undertaking. I therefore pray you once more to urge the necessity of having an Assistant of some kind appointed. I trust and feel sure you will not allow my addressing you on this subject to injure my Husband in any way. I was at Plymouth, but when the Officers went on board on Thursday last none were allowed to leave the vessel after, therefore am at a loss to know if they touch at any Port on the voyage out, or I would write him. Once more I beg to apologise and in the fervent hope that you will bear my Husband in mind, allow me to remain, Sir, your most respectfully, Charlotte Bynoe.

Mrs. Bynoe might well be concerned, not only because of what Benjamin had told her about the fatal port when the *Beagle* lay there, but because of the steady incidence of deaths from yellow fever which had occurred in ships visiting it since that time. Indeed, the provision of an assistant might have been urged on other grounds than those of relieving the surgeon of some of his duties, but Sir William was concerned with the threat of the War which broke out in the Crimea four months later, and he avoided the issue of Charlotte's letter. His official minute merely reads "Tell Mrs. Bynoe I am not aware whether the Madagascar touches at any port going out or not. W. B."

Following their abrupt parting at Plymouth, the Bynoes were left for nearly six years to find what comfort they could in freedom from half-pay and the enjoyment of the extra allowance of £30 a year granted to the surgeon of the receiving ship at Rio.

The long commission passed without a note of commendation and was marked only by the bleak entry on 3 October 1855 that Mr. Bynoe had failed to render his accounts for *Madagascar* and his medicines and Bedding Store account at Rio de Janeiro. There was indeed an unbridgeable gulf between those neat clerical entries in their fine copperplate script and the surgeon in the steaming heat of Rio harbour.

These long absences on remote stations, with correspondence un-

certain and delayed, must have removed from Bynoe any remaining opportunity to bridge another gap, that which had developed between himself and his botanical associates in London. In 1853, George Bentham described a shrubby acacia, found by Bynoe when the *Beagle* was off the northwest coast of Australia which was now at Kew, and although there were still occasional references to him in the publications of the botanical world, this Acacia Bynoeana was to remain the only living memorial to him. When in 1860 Joseph Hooker produced the third part of his great *Botany of the Antarctic Voyage,* he referred to the *Beagle* expedition of 1837-43 and how "Mr. Bynoe, the surgeon, made some valuable collections, chiefly on Dupuch Island, the Abrolhos, the Victoria River, Bass' Straits, and in New South Wales, which are preserved in Sir William Hooker's herbarium." Possibly Bynoe had established contact with Joseph Hooker after he returned from Rio in the *Industry* in the spring of 1859. But it seems probable that they had met before this in view of their common interest in Australian flora and their mutual experience under McCormick. Moreover both the *Beagle* and the *Erebus* and *Terror* expeditions had sometimes been in the same areas, for the Antarctic expedition wintered in Tasmania and New Zealand. When Bynoe returned from Rio, Hooker was assistant director at Kew, and in June, 1859 the Bynoes went to live at 7, Russell Place in the Old Kent Road so that meetings would have been possible. Bynoe now had unlimited leisure, for in the autumn of 1860 he was promoted to Staff Surgeon but was not employed again. He could, if he wished, visit Kew frequently to look at the herbarium where his plants had been carefully arranged. The one hundred and seventy duplicate plants at the British Museum were, however, still stored away "unarranged in their original parcels" in which Wickham had presented them in 1842.

It seems unlikely that he maintained touch with Charles Darwin, now living a withdrawn life at Down in constant ill health; Darwin's interest throughout the long interval had been with zoology and it was only now that he began to take up botanical studies.

On 23 January 1863 Bynoe was placed on the retired list by Admiralty Order. He was close on sixty and life had contracted to the immediate neighbourhood of the Old Kent Road. There is no record of how he passed the time; perhaps he followed the endless controversy which arose on Darwin's publication of the *Origin of Species* in 1859. It must have recalled to Bynoe how for nine days in October, 1835 he and Darwin had been left ashore in the Galapagos Islands, for it was there

that Darwin had developed many of his ideas for the *Origin* while observing the birds on James Island. They had studied the rocks, the lizards, the tortoises, and the vegetation, while living off tortoise fried in oil and tortoise soup; the fresh water which they had landed for themselves and the three seamen attending them, was spoiled by the surf and they were saved from thirst through the "extraordinary kindness of Yankeys," when an American whaler landed three casks for them.

In the spring of 1865 Bynoe heard of the suicide of his old commander, Admiral Fitzroy, and as the autumn approached and his health failed, his thoughts drifted back to those days nearly forty years ago. They lingered on the long interval of unequalled exploration from 1825 to 1843 that had preceded his decline into the convict ships. He dwelt on his gradual eclipse and the rising stars of two other naval surgeons—Hooker and Huxley, and on Darwin's already unassailable scientific eminence. But his life was ending now and he could do nothing to mend his own position or his impecuniousness.

On Monday, 13 November 1865, he died and two days later Charlotte inserted under "Deaths" in *The Times* the brief notice: "On the 13th inst. at 440, Old Kent Road, Benjamin Bynoe, Esq., M.D., Staff Surgeon R.N. aged 61," and opened his will made so long ago. His estate was under £450.

Acknowledgment

My grateful thanks are due Lady Barlow; the Director, Royal Botanic Gardens, Kew; Dr. W. R. Philipson of the British Museum (Natural History); and E. M. Shilstone, M.B.E., F.S.A. of the Barbados Museum.

REFERENCES

Assistant Surgeons' Register, No. 1, Part 2, Folio 346. MS. at Public Record Office, London.

BACON, F. *Essays,* "Of Gardens." Ed. R. Whateley. London, 1856, pp. 404-411.

BARLOW, N., ed. *Charles Darwin's diary of the voyage of H.M.S. Beagle.* Cambridge, 1933.

BENTHAM, G. *Linnaea.* London, 1853, *26,* 614.

BENTHAM, G. *Flora Australiensis.* London, 1863-1873. 6 vols. Vol. 2 (1864), p. 614.

BIRKENHEAD, Earl of, Ed. *The adventures of Ralph Rashleigh, a penal exile in Australia, 1825-1844.* London, 1929.

BRITTEN, J. and BOULGER, G. S. *British and Irish botanists.* London, 1893. (2nd ed., 1931).

BYNOE, B. *Medical journal of the Blundell.* 1844. Ad. 101/12/7, MS. at Public Record Office, London.

BYNOE, B. *Medical journal of the Aboukir.* 1851. Ad. 101/1/1. MS. at Public Record Office, London.

BYNOE, B. *Will* proved 18th January, 1866. MS. at Somerset House, London.

BYNOE, C. *Letter* to Sir William Burnett. MS. included in Surgeons' Register. No. 3 Part

1. Folio 57. Public Record Office, London, 1853.

BYRON, J. *Narrative of the great distresses suffered by himself and his companions on the coasts of Patagonia. . . .* London, 1768.

CREIGHTON, C. *History of epidemics in Britain.* Cambridge, 1894. 2 vols.

DARWIN, C. *Narrative of the surveying voyages of H.M. Ships Adventure and Beagle, 1826-1836.* Vol. III. London, 1839.

DARWIN, C. *Journal of researches into the natural history and geology of the countries visited during the voyage of H.M.S. Beagle round the world.* 2nd ed. London, 1845.

DARWIN, C. *On the origin of species. . . .* London, 1859.

FITZROY, R. *Narrative of the surveying voyages of H.M. Ships Adventure and Beagle, 1826-1836.* Vol. II. London, 1839.

Gazeteer of the World. Vol. II. London, 1856.

History of the collections contained in the Natural History Department of the British Museum. Vol. I. London, 1904.

HOOKER, J. D. *Botany of the antarctic voyage. . . .* Part III, Vol. I, *Flora Tasmaniae,* p. cxvii, 1860. (6 vols. 1844-1860)

HUXLEY, L. *Life and letters of Sir Joseph Dalton Hooker.* London, 1918. 2 vols.

KEEVIL, J. J. William Anderson, 1748-1778. *Ann. med. Hist.,* 1933, *5,* 511-524.

KEEVIL, J. J. Some forgotten medical memorials. *J. roy. nav. med. Serv.,* 1938, *24,* 93-99.

KEEVIL, J. J. Robert McCormick. *J. roy. nav. med. Serv.,* 1943, *29,* 36-62.

KING, P. P. *Sailing directions to the coasts of eastern and western Patagonia.* London, 1832.

KING, P. P. *Narrative of the surveying voyages of H.M. Ships Adventure and Beagle, 1826-1836.* Vol. I. London, 1839.

Log of H.M.S. Beagle, 1831-1836. Ad. 53/236. MS. at Public Record Office, London.

MAIDEN, J. H. Record of western Australian botanists. *J. Proc. nat. Hist. Sci. Soc. West. Aust., 1909, 1,* no. 6, 10.

MOORE, S. *J. linn. Soc.* (*Bot.*), 1920, *45,* no. 302. 194.

MUELLER, F. *Icon. Austral. Acacia Dec.,* 1887, iii (plate of Acacia Bynoeana).

O'ROURKE, J. *History of the great Irish famine of 1847 . . . .* Dublin, 1875.

PLARR, V. G. *Plarr's lives of the Fellows of the Royal College of Surgeons of England.* London, 1930. 2 vols.

ROBERTS, J. J. W. *Medical journal of the Lord Auckland,* 1846. Ad. 101/43/7. M.S. at Public Record Office, London.

ROLLESTON, H. D. Sir William Burnett. *J. roy. nav. med. Serv.,* 1922, *8,* 1.

ROLLESTON, H. D. Sir John Richardson. *J. roy. nav. med. Serv.,* 1924, *10.*

ROSS, J. C. *Voyages of discovery and research in the southern and antarctic regions during the years 1839-1843.* London, 1847. 2 vols.

SCOTT, E. *Life of Matthew Flinders.* Sydney, 1914.

SLOCUM, J. *Sailing alone around the world.* 3rd ed. London, n.d.

SMITH MSS. Vol. 1, page 234, at Society of Genealogists, London.

SMITH, E. *Life of Sir Joseph Banks.* London, 1911.

South American Pilot. London, Hydrographic Dept. Admiralty, 1942. Part II. 13th ed.

Statistical report for the health of the Navy for the year 1902, Report of Journals of Medical officers examined at the Public Record Office, 1793-1856. London, H.M. Stat. Office, pp. 129-148.

STOKES, J. L. *Discoveries in Australia with an account of the coasts and rivers explored and surveyed during the voyage of the Beagle, 1837-1843.* London, 1846. 2 vols.

Surgeons' Register, No. 3 Part i. Folio 57. MS. at Public Record Office, London.

THE TIMES. *See* Deaths, 15 Nov. 1865, p.l.

THE TIMES. *Survey atlas of the world.* London, 1922.

Trans. Proc. roy. Soc. S. Aust., 1917, *41,* t. 11. (plate of *Acacia Bynoeana*).

Notes and Queries

Edited by RALPH H. MAJOR, M.D.*

Explanation

Under date of 2 November 1948, Dr. Charles Singer writes to the Editor:

"In an able review of the *Prelude to Science* by Dr. Rabin and myself in your last number, Professor Izquierdo writes that 'it is to be regretted that the whole surface of each sheet was not used, so as to have full-scale reproductions.' Since this criticism has been made in every review emanating from America that I have seen, it seems that some misunderstanding prevails as to printing conditions on this side of the Atlantic. I therefore give the reasons that moved Dr. Rabin and myself, as well as the printers and publishers, to decide against reproducing the sheets of full size:

"(1) It would double the price of the book.
"(2) It would have delayed publication for months.
"(3) It would have made it impossible to back the plates with 'mull,' a fabric difficult to obtain here.
"(4) It would make an extremely inconvenient format or an even more inconvenient folding, each plate being four times the present size.
"(5) Almost full-size reproductions are readily accessible in the *Eicones Vesalii*."

Scottish Society of the History of Medicine

The third meeting of the Scottish Society of the History of Medicine was held in the hall of the Royal Faculty of Physicians and Surgeons, Glasgow—Dr. Douglas Guthrie in the chair. Papers were read by Professor J. D. Mackie, of the Chair of Scottish History and Literature, University of Glasgow, and Mr. A. L. Goodall, Honorary Librarian to the Faculty.

Professor Mackie, in his account of Glasgow, showed how much its early history was dominated by that of the bishopric of the city. The university, founded in 1451, was at first modelled on French lines, but after the Reformation it was reorganized by Andrew Melville, and since then it had taken its place as one of the great seats of learning in the world.

Mr. Goodall said that the Faculty was unique among medical corporations in Scotland, in that both physicians and surgeons were united in one body. The Faculty, founded in 1599 by Maister Peter Lowe, received its charter from James VI the same year. Among its many duties were the examination

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and licensing of all surgeons in the West of Scotland, supervision of their conduct, and the ensuring that any drugs supplied were of the highest quality.

A service of free medical aid to the poor of the city was a noteworthy feature of the Faculty's activities. Many famous men in medicine and surgery, like Cullen, Lister, and Macewen, had associations with the Faculty, which will celebrate next year its 350th anniversary.

A Note on the Identity of "SANAQ, THE INDIAN," mentioned by Medieval Arabian Writers

"Sanaq, the Indian" is mentioned by Ibn Abi Usaibi'a, a Syrian writer of the thirteenth century, as the author of "a book on poison," translated into Arabic under the orders of the Caliphs of Bagdad, in the eighth century A.D. Dr. Ray, in his learned work, *History of Hindu Chemistry*,[1] refers to the studies of a number of German Orientalists, who have closely examined the literature of Arabs. He quotes from Gildemeister's *Scriptorum Arabum de rebus Indicis loci et opuscula* and freely draws upon the results of Müller's studies[2] of the twelfth book of Usaibi'a. These workers have conclusively established that not only the works of Charaka and Sushruta but also a number of other Hindu treatises on medicine were read and translated into Arabic during the reign of the Abbaside Caliphs.

Müller was the first to point out the parallelism in the subject matter and language between Sanaq and Sushruta. Dr. Ray supplements Müller's observations by adding a similar passage from Charaka. The parallel passages from Sanaq, Sushruta, and Charaka, as presented by Dr. Ray in a tabular form, are reproduced below.

Sanaq The Indian	Charaka (*Chikt. Sta. Ch. XXIII*)	Sushruta (*Kalpa, Ch. I*)
The vapour emitted by poisoned food has the colour of the throat of the peacock . . . when the food is thrown into fire, it rises high in the air, the fire makes a crackling sound as when salt deflagrates . . . the smoke has the smell of burnt corpse. Poisoned drinks; buttermilk and thin milk have a light blue to yellow line.	The food is to be thrown into fire for testing . . . the flame becomes particoloured like the plume of a peacock. The tongue of flame also becomes pointed; a crackling sound is emitted and the smell of a putrid corpse is perceived . . . water, milk and other drinking liquids, when mixed with poison have blue lines printed upon.	When poisoned food is thrown into fire, it makes crackling sound and the flame issuing therefrom is tinted like the throat of the peacock.

Dr. Ray also observes: "The Physician as superintendent of the kitchen, well versed in toxicology, is essentially an Indian Institution," and cites the authority of Sushruta for the above statement (*Kalpa*, Ch. I).

[1] P. C. Ray, *A short history of Hindu chemistry*. Vol. I. 2nd Ed. London, Williams and Norgate, 1904.

[2] Müller. *Z.dtsch. morgenländ. Ges., 34*, 465, quoted by Ray.

Whether Müller had any idea who this Sanaq could possibly be, I cannot say, as I have not been able to peruse the entire original paper by him. Dr. Ray makes no attempt to identify Sanaq. Nearly half a century ago, with the scanty materials at their disposal, they did what was possible to bring about a better understanding of the inter-relations between Hindu and Arab medicine.

An attempt has to be made now to collect and arrange all that has been said or quoted from Sanaq in the various books and compilations of medieval Arabian medical writers and bibliographers.

A few years after the publication of the contributions of Müller and Ray, a momentous literary discovery was made in India, when the manuscript of the *Artha Sastra* of Kautilya was unearthed by the late Pandit Shama Sastry. The book has been translated into German and English. I have made use of the English translation.[3]

In the course of an extensive examination of source materials for the reconstruction of the history of medicine in Ancient India, from reliable and datable records and literature, a very close study was made of the various sections in *Artha Sastra,* written by Kautilya, also known as Chanakya.

Among many interesting topics discussed in it is the same subject, namely, Poison, mentioned by Sanaq. The very phraseology and the same terms used by Sanaq have also been employed in this book. The rôle of the Royal Physician in the protection of the life of the King by constant vigilance, and his responsibility for supervising, checking, or testing the food and drink of Royalty before these were served are all clearly set down. Artha Sastra states: "When the flame and the smoke turn blue and crackle, and when birds (that eat the oblation) die, presence of poison (in the dish) shall be inferred. When the vapour arising from cooked rice possesses the colour of the neck of a peacock, and appears chill as if suddenly cooled, when vegetables possess an unnatural colour, and are watery and hardened, and appear to have suddenly turned dry, being possessed of broken layers of blackish foam, and being devoid of smell, touch and taste natural to them; when utensils reflect light either more or less than usual, and are covered with a layer of foam at their edges; when any liquid preparation possesses streaks on its surface; when milk bears a bluish streak in the centre of its surface; when liquor and water possess reddish streaks; when curd is marked with black and dark streaks, and honey with white streaks; when watery things appear parched as if overcooked and look blue and swollen; when dry things appear soft, and soft things hard; when minute animalcula die in the vicinity of the dishes, when carpets and curtains possess blackish circular spots, with their threads and hair fallen off; when metallic vessels set with gems appear tarnished as though by roasting, and have lost their polish, colour, shine and softness of touch, presence of poison shall be inferred." *Mudrarakshasa,* a Sanskrit drama portraying the times of Chandra Gupta Mourya and the clever tactics of his preceptor (also prime minister), the great Chanakya, also refers to the ever-present danger

[3] *The Arthasastra of Kautilya,* translated into English by R. Shama Sastry, Bangalore, Government Press, 1915.

of poison to the King and the measures to safeguard the King. This is not the place to discuss the relative priority and times of the three authors, or of the date of composition of these treatises. They reveal that the need for knowledge on the subject of poisoning must have been great and urgent at the hub of the Abbaside Empire, with all the splendour and intrigue of the Court. And what treatise could be more appropriate or better appreciated by Royalty than the incomparable manual of administration and polity, composed by the great architect of the Mouryan Empire, for the safeguarding of the health and life of the first of the Mouryan Emperors? The Arab Court must have been familiar both with the tradition and literature of the Mouryan and Gupta times.

It is possible that the entire series of books, collectively called "Arthasastra," was translated and that mention is made of the *Book on Poison* by Sanaq because the Arab compiler or bibliographer was then dealing with medical literature or because the particular section was better known to the Arabs than the rest of the Treatise.

"Kautilya" was not a name likely to have been familiar to foreigners, but "Chanakya" was famous all over the country or the world, in tradition and popular speech.

Lastly, the transformation of the word "Chanakya" into "Sanaq" can be easily explained on phonetic principles. As Dr. Ray pointed out, "that Charaka should be changed into Sarak, Sushruta into Susrud, etc., need not surprise us. . . . Moreover, one must remember that the Indian works translated into Arabic were sometimes derived from pre-existing Phelvi versions and in the migration, through successive languages, the names often got frightfully disfigured." So, a suggestion is now made that Sanaq the Indian mentioned in Arabian compendia is no other than Chanakya.

Madras, India D. V. S. Reddy

Answer to Query No. 13 (*J. Hist. Med.*, 1948, *3*, 360-361)

Callisen's listing of the thesis means no more, I think, than does its listing in the U. of P. alumni catalogues. The list of 1824 medical graduates, with their provenance and the subject of their essays, was published in the *Phila. J. of the Med. and Physical Sciences* of that year, along with the date—8 April 1824—on which the degrees were conferred. A spot check indicates that all of the graduates had similar listings in Callisen and that there were others listed by him of whose theses there is no record of publication. (Curiously, the date 4 April is given for the doctoral day of the others, too, so C. may not have used the Chapman Journal list; but I suspect that he did and that a single original error in transcription of the day of the month continued with each of the listings.)

College of Physicians, Philadelphia W. B. McDaniel, 2d

Answer to Query No. 14 [wrongly listed 13] (*J. Hist. Med.*, 1948, *3*, 444)

You should hear Osler's adjacent ashes chuckle at the weird attempts made by the present Latin-free generation to Italianize or Ciceronify the title of his favorite book! The "Religio medici" is an English classic, written in English three centuries ago, long enough for its Latin title to be naturalized, even if it had not always been sounded English fashion until recently! Osler pronounced it like the English word "religion" (without the "n") and "meddasigh" (rhyming with "shed a sigh"). He and his contemporaries could no more "medda see' or "medda key" it, let alone "med-*each*-y" (shades of Lorenzo!), than they would "weekay waresaw" *vice versa* or "alley bee" an alibi in speaking English.

To paraphrase Lewis Carroll:

They say it in Latin, they say it in Cree
They say it in Hebrew and Greek,
But they wholly forget, and it vexes T.B.,
That English is what we speak
—or ought to!

W. W. FRANCIS
Osler Librarian

McGill University, Montreal

Book Reviews

CASTALIA. *Rivista di Storia della Medicina.* Direttore Nicola Latronico. Vol. I-II, 1945-1946. *Castalia. La Medicina nella Storia e nell'Arte.* Revista bimestrale, diretta da N. Latronico. Vol. III-IV, Milan, Via Gran Sasso 5, 1947-48. Subcription price: In Italy Lire 1000, in foreign countries Lire 2000.

THERE ARE two types of scientific and scholarly journals. There are journals controlled by a publisher or a society which are primarily repositories of studies from many different sources. Their standard is determined first of all by the caliber of the editor who decides which papers submitted are worth being published, who inspires articles to be written, and who combines papers in a number in such a way that it becomes an organic and attractive whole.

There are other journals which are organs of a school, an institute, or an integrated group of researchers. Every new group or movement needs such a means of expression. One hundred years ago when Germany was fighting for "Medical Reform" Virchow founded a journal under that name which became the organ of all progressive physicians of the country, and his *Archiv für pathologische Anatomie und Physiologie* was the voice of the new pathology and reflected in every number the strong personality of its founder. When the first Institute of the History of Medicine was created at Leipzig, Karl Sudhoff as a matter of course launched the *Archiv für Geschichte der Medizin* which for a long time was the leading periodical in the field. In America, the Johns Hopkins Hospital in 1889 and the School of Medicine in 1893 immediately felt the need for periodicals that would carry their message to the country and in subsequent years the opening up of new departments led to the creation of new journals.

Thus we understand very well that when Professor Latronico founded a new center of medico-historical studies, the School of the History of Medicine at the University of Milan (which soon attracted a very active group of young scholars), he needed not only a series of monographs but a journal as well. Italy at that time had two established periodicals in the field—the *Rivista di Storia Critica delle Scienze Mediche e Naturali,* founded in 1910 as organ of the society that bears the same name and very ably edited by Andrea Corsini, and the *Bollettino dell'Istituto Storico Italiano dell'Arte Sanitaria* founded in 1921 as organ of the Roman Institute, edited in the beginning by G. Carbonelli and P. Capparoni, then after Carbonelli's death by Capparoni and Pazzini.

It was published as an appendix to the *Rassegna di Clinica, Terapia e Scienze Affini*. When the Institute became an Academy the journal changed its name to *Atti e memorie dell'Accademia di Storia dell'Arte Sanitaria*, and after Capparoni's recent death it was edited by Silvestro Baglioni.

But the Milanese School needed an organ also and as soon as the fighting was ended, in July 1945, *Castalia* was born, named after the spring of Mount Parnassus, source of inspiration to the poets. It is an extremely encouraging symptom to find that the cultural life of Italy was never interrupted and that a new journal could be founded after a war in which the country suffered so much. The purpose of the journal was:

> To help in making historical studies known through the publication of original researches, of critical discussions, of summary articles and those of a more educational character.
>
> To stimulate the unearthing of the unknown or little known treasures of ancient medicine preserved in the museums, archives, and libraries of Italy.
>
> To lead physicians back to the ancient sources of knowledge and to help them to read the old texts through new translations or critical interpretations.
>
> To promote the application of the *historical method* to the study of medicine; and to place our present medicine in the general framework of medical thought.

It was a beautiful program, well conceived and well carried out. From July 1945 to the end of 1946 the journal was published regularly as a bi-monthly on relatively good paper with good illustrations. But then it was hit by postwar difficulties. The cost of living and, hence, the cost of printing were soaring and the number of subscribers did not rise in proportion. Only one number was published in 1947 and a reorganization became imperative. It was carried through, and with the January-February number of 1948 *Castalia* resumed regular publication.

The individual numbers contain main articles, texts, and documents, notes and comments, news, book reviews, and lists of new publications. The materials are mostly although not exclusively Italian, but we must remember that the medical history that was made on Italian soil was for more than two thousand years world history of medicine. Due to the isolation created by the war and the events that preceded it the foreign literature seems not sufficiently known, but now that cultural relations are gradually reëstablished and with Professor Castiglioni as transmitter this will undoubtedly change, although language barriers, inflation, and currency restrictions make international cultural relations difficult enough.

Professor Latronico is to be congratulated upon his manifold creations, his flourishing School, his thriving series of monographs, and his beautiful journal, and we sincerely hope that he will be able to steer them all safely through the uncertainties of the future.

Pura, Switzerland HENRY E. SIGERIST

LYCHNOS. Lärdomshistoriska Samfundets Årsbok, 1946-1947. Uppsala and Stockholm, Almqvist & Wilksells Boktryckeri AB, 1947. x + 564 pp.

ONCE again *Lychnos,* the yearbook of the Swedish History of Science Society, has arrived with a full and nourishing measure of intellectual fare. It contains thirteen papers as follows:

Emil Bovin: Was Pehr Gustaf Cederschjöld a forerunner of Semmelweis (in Swedish, with French résumé)?

Pierre Brunet: The first experimental studies on lightning and atmospheric electricity (in French).

Christian Callmer: The journey of Jacob Jonas Björnstahl in Thessaly, his death and the fate of his manuscripts and books (in Swedish).

A. R. Cederberg: Economics professors in Åbo in 1747 (in Swedish).

Axel Garboe: Niels Steensen (Steno) as seen from a Zealand country parsonage (in Danish).

Otto Gertz: A technically notable botanical work (in Swedish).

Anders Grape: Scheele, Schulzenheim and the Swedish pharmacopoeia of 1775 (in Swedish).

Nils von Hofsten: Lamarck. A bicentennial anniversary (in Swedish).

Sten Lindroth: Urban Hiärne and *Laboratorium Chymicum* (in Swedish).

Jean Pelseneer: The Protestant origin of modern science (in French).

Gunnar Rudberg: Johan Spongberg. Some notes (in Swedish).

Herbert Weisinger: The idea of the Renaissance and the rise of science (in English).

Albert Wifstrand: Culture, the history of a concept (in Swedish).

In addition there is an extensive section containing reviews of books and relevant journals.

Of particular interest to the reviewer is Sten Lindroth's excellent paper on Urban Hiärne (1641-1724), Swedish physician and chemist. Hiärne was an outstanding Paracelsist and actually marks the culmination of Paracelsism in Sweden. One can recommend this paper to all who are interested in Paracelsus and the fate of his ideas.

GEORGE ROSEN

MORRIS FISHBEIN, *et al. A History of the American Medical Association 1847 to 1947.* Philadelphia and London, W. B. Saunders Company, *c*1947. xvi + 1226 pp. $10.00.

IN 1845, after a suggestion by Dr. Alden March of Albany, New York, Dr. Nathan Smith Davis introduced into the New York State Medical Society a resolution calling for a national medical convention to be attended by delegates from medical colleges and state organizations. Dr. Davis became chairman of

the committee to carry into effect the resolutions which were passed and which opponents labeled as "impracticable if not Utopian." This twenty-nine-year-old country practitioner proved his ability to make the meeting an accomplished fact.

The first national medical convention was held in New York in May, 1846. There was sufficient representation to make successful plans for an 1847 meeting, which was held in May at the Academy of Natural Sciences in Philadelphia. The almost two hundred and fifty delegates from forty medical societies and twenty-eight medical colleges who attended this meeting were successful in organizing the American Medical Association.

In 1929 the Board of Trustees of the Association appointed a committee to prepare a centennial history. The members of this committee were R. L. Sensenich, chairman; Ernest E. Irons, secretary; Dwight H. Murray, William F. Braasch, Louis H. Bauer, E. L. Henderson, John H. Fitzgibbon, James R. Miller, and C. W. Roberts. The Association presented the volume in 1947 "as a record of its founder, its founding, its ideals and its motivations, and the extent to which these have been accomplished over a period of one hundred years."

Morris Fishbein, the editor, and twenty-eight other well-informed persons (members of the AMA staff and of the profession) have contributed to the building of this encyclopedic volume (1200 pages) which traces the history and delineates the function of a powerful professional organization.

The book opens with a fourteen-page account of the life and heroic struggles of the "grand old man of the Association" and its founder, Nathan Smith Davis, by his lineal descendent Nathan Smith Davis III. Following the introductory chapter on the life of the founder, Fishbein presents a sizeable section which gives a narrative year-by-year sketch of the organization from its conception to the end of the centennial period. It concludes with very interesting chapters on libel suits brought against the Association and its indictment and trial by the Federal Government. There is a short chapter presenting brief biographical sketches of the nine members whom the Association's House of Delegates has chosen to honor with its distinguished service medal, as follows: Rudolph Matas, 1938; James B. Herrick, 1939; Chevalier Jackson, 1940; James Ewing, 1941; Ludvig Hektoen, 1942; Elliott P. Joslin, 1943; George Dock, 1944; George R. Minot, 1945; and A. J. Carlson, 1946. Walter L. Bierring, an elder medical statesman from Iowa, devotes 225 pages to biographical sketches of the 101 presidents who have served the Association. As might be expected, Bierring indulges in some rather fulsome praise of the profession's mighty men. Numerous authors participate in that portion of the book given over to a discussion of the councils, bureaus, committees, and sections, including an exposition on the place and purpose of the Woman's Auxiliary by its president, Mrs. Jesse D. Hamer. The history of the well-known

Journal of the Association is discussed as a part of the growth and development of the organization in general. The Association's other thirteen periodicals are presented in a seventy-four-page section on publications.

Ernest E. Irons has a chapter entitled, "Trustees of the American Medical Association." In it he recalls some of the incidents which mark the expansion and development of the organization. The Board of Trustees has come to be the agency for implementing the policies of the House of Delegates between its regular sessions. Prior to the establishment of the *Journal,* the proceedings of the annual meetings, together with a few articles of a professional nature, were published in a volume called the *Transactions of the American Medical Association.* As early as 1870, Samuel D. Gross urged that the annual *Transactions* be replaced by a periodical medical journal. After repeated agitation the *Journal* was established in 1883, the same year in which the first Board of Trustees was set up. In fact, previous to the publication of the *Journal* there was, according to Irons, little need for a Board of Trustees. Customarily, for some years after 1883 the Trustees were referred to as the Trustees of the *Journal* and not of the Association.

The year 1897 marks the time when legal incorporation was deemed necessary. The total assets of that year amounted to almost $50,000 including property, cash, and securities. By February, 1903, the Association had accumulated sufficient funds, presumably from the revenues of the *Journal,* to build a permanent home. In addition, it had on hand $25,000 in gilt edge securities.

At the turn of the century George H. Simmons was editor and general manager. The Board sustained him in his strong stand against accepting *Journal* advertisements characterized by false claims or secrecy of formulae. In 1904, Simmons proposed and secured an appropriation for the establishment of the Council on Pharmacy and Chemistry. By 1906 the clean advertising policy of the Journal had aroused the wrath of the proprietary medicine interests. In time these attacks reached a vicious crescendo, which aroused the resentment of the profession generally.

The Association's first specialty periodical was in the field of internal medicine. It began publication in 1907 and ultimately was named *Archives of Internal Medicine.* In collaboration with the Rockefeller Foundation in 1918 the Association began publishing a Spanish edition of the *Journal.* This project was abandoned after several years. The *Quarterly Cumulative Index* was started in 1919 and the popular journal, *Hygeia* begun in 1922. Publication of a journal in the field of surgery was not started until 1923.

An increasing volume of business and an expanding field of activity and responsibility led to important organizational changes during the twenties. Three yearly meetings of the entire Board were provided for: one at the annual session, one in October, and one in February, with an executive committee meeting at intervals of about one month. The term of service for a trustee was

increased from three to five years with the provision that no trustee serve more than two terms.

Following the death of Alexander Craig in 1922, Olin West became secretary of the Association, and after the retirement of Simmons in 1924, West became general manager as well as secretary. He continued in this capacity until 30 June, 1946, when he was succeeded by George F. Lull, formerly a major general and Deputy Surgeon General of the United States Army. West became president-elect at the San Francisco meeting in 1946, but ill health forced his resignation in early 1947. Edward Bortz of Philadelphia succeeded him. Morris Fishbein, who joined the Association staff as assistant to Simmons in 1913, became editor of the *Journal* in 1924 on Simmons' retirement.

The burdensome war years and the problems of postwar readjustment have increased the regularly scheduled meetings of the Board to four each year, two of which extend throughout the annual and winter meetings of the House. Officers and trustees of the Association are finding that the increasing complexity of problems facing the profession makes more than ordinary demands on their time.

Portions of Fishbein's chapter on the libel suits brought against the Association should be of more than ordinary interest to laymen. The majority of these suits were filed because of the editor's refusal to accept advertising copy or as a result of his publishing in the *Journal* or *Hygeia* alleged libelous remarks about nostrums, cure-alls, and quack healers. This chapter reveals the regrettable gullibility of the American public.

The chapter giving the history of the Council on Medical Education and Hospitals by Victor Johnson, Secretary of the Council, will probably receive the acclaim of professional historians as being the most satisfactory contribution to the centennial volume. The reviewer reaches this conclusion for two reasons: one, Johnson's social and economic frame of reference does much to set his story historically in its proper relationship to the culture of which it is a part; two, his account is well documented. Although Johnson's sketch of the Council on Medical Education and Hospitals is not offered as a history of American medical education during the past century, his thirty-six-page chapter is the best and most recent survey of the subject.

Limited space does not permit a discussion of other features of this worthwhile addition to the historical literature of American medicine. The order of presentation is good. Typography is satisfactory. So far as information goes the volume is excellent. Unfortunately, with the exception of Victor Johnson's contribution, documentation is generally quite poor, indeed completely lacking in many sections. The volume is not well laid on a background of the social and cultural fabric of the times—there is still need for a critical history of the American Medical Association.

The student of American history casually leafing through this ponderous

tome and noting its structural organization and numerous portraits with their respective facsimile signatures, will probably be reminded of the many city, town, county, and organizational centennial volumes which colored but lent scant luster to nineteenth century *Americana*. This bulky record, sired by Editor Fishbein, is representative of the best in commemorative book writing where a multiplicity of authors is involved. Historically, the study spans a century marked at its beginning by Jacksonian democracy's emphasis on the "common man," and signalized at its end by Rooseveltian democracy's hurrah over the "forgotten man." The period began with a growing belief by medical leaders in the need for better state regulation of licensing and terminated in tumultous years of public agitation for better medical care.

To the historian the content of the volume is of national importance, social significance, and economic meaning. Indeed, had it been written in the spirit of critical analysis and historical insight, it might well have been a classic in scale and mold. Such a result is obviously quite impossible where numerous authors are involved, most of them apparently not trained scientifically in historiography. Nevertheless, the book is generally well done textually within the limits of its planning.

Los Angeles, California W. F. Norwood

The Royal Botanical Expedition to New Spain 1788-1820, translated and collated by Harold William Rickett. Chronica Botanica, Vol. II. Waltham, Mass., The Chronica Botanica Co.; New York, Stechert-Hafner, Inc., 1947. 86 pp. $2.50.

In 1787, Charles III of Spain sent an *Expedición Botánica* to survey the natural productions of his domain of Nueva España. The expedition was ordered to establish a botanical garden and to initiate courses in botany in addition to its duties of travelling, exploring, and collecting. As the project operated under a royal directive, copious records were kept—records of salaries, expenses, itineraries, etc. These official papers also contain many personal letters written by members of the expedition. The whole of the existing files are incorporated in the national archives of Mexico, *Archivo general de la nación,* series *Historia,* volumes 460-466.

The task of Dr. Rickett was to collate the primary sources, reconstruct the activities of the expedition, and evaluate its accomplishments. In this he has succeeded. In fact, an almost unknown—in the United States at least—chapter in the history of American science has been recovered and made available to botanists, pharmacists, and historians.

The expedition lasted thirty-two years. A botanical garden was established in Mexico City and, as the first site proved to be too swampy, established a second time in better surroundings. The leader of the expedition, Don Martin

de Sessé, was made a professor in the Royal and Pontifical University of Mexico and gave courses in botany beginning in the year 1788. A number of students were trained in the elements of the science and the task of systematizing the Mexican flora and of searching for native medicinal plants was begun. Botany was studied both as a science in itself and as an adjunct to agriculture and medicine. Native animals were collected and dissected by the "biologist" of the expedition, José Longinus Martinez, and drawings were made of them for the record. In 1820 the expedition returned to Spain with its scientific collections.

The author, for Dr. Rickett is more than a collator and translator, has done an extremely neat piece of historical detective work and has presented his findings in an exceptionally clear and interesting manner.

Philadelphia, Pa. CONWAY ZIRKLE

HERBERT GAMBRELL. *Anson Jones. The Last President of Texas.* Garden City, New York, Doubleday & Company, Inc., 1948. viii + 462 pp. Map endpapers and frontispiece. $5.00.

WITH THE possible exception of Ashbel Smith, Anson Jones was the most eminent physician of early Texas. It is surprising that a century should pass before the work of these two men was presented in biographical form. Dr. Gambrell has filled this deficiency in the case of Anson Jones. Miss Harriet Smither, archivist of the Texas State Library, long a serious student of Ashbel Smith, will, it is hoped, soon give the reading public the benefit of her studies.

With a firm grasp of his subject, Dr. Gambrell depicts the life of Anson Jones from a childhood of poverty in Massachusetts to an untimely death in far-off Texas in 1858, sixty years later. In this interval of time are crowded the many important, serious, and tragic events of his life from school teacher and medical student to his eventual elevation to the presidency of the Republic of Texas.

The author recognizes and treats with sympathetic understanding the dominant characteristic of Anson Jones' life. This is an emotional personality which runs like a thread from his cradle to his grave. Here was a timid and sensitive youngster, the thirteenth child of the family, born in poverty, who would have been content to become a saddle maker, like his father and brothers. But his father and older sisters forced him into the practice of medicine, for which he had no desire and little aptitude and at which he failed more often than he succeeded. And he was to fail in business as well. By nature he was ill-prepared to withstand "the bludgeonings of chance." Failure in all ventures and escape into the warm selfishness of mint juleps and the safe impersonal battle of dice and cards were his lot until Texas found him. Defeat and frustration pursued him to the very moment he reached Texas. Then success in full measure was his for twelve years. Texas gave him financial

security and self-confidence, which he had never known before. "I have ***never been beaten*** in my life for any office,—nor do I ever intend to be." Thus he epitomized his conquest of his feeling of inferiority. But he *was* defeated and defeat crushed his sensitive soul. No frontier in another Texas beckoned this time. A bullet through his head was to him the only way out. When Texas rejected him for the first time, in his last election for unsought office, part of him died. He killed off the remainder which he had never rated very highly anyway.

For this age when profound neuroses are so prevalent, there is much of courage in what Anson Jones accomplished in and for Texas. Few men have done more. In a space of twelve years he was physician, soldier at San Jacinto, congressman, minister to the United States, senator, secretary of state, and president of the Republic. In all these he manifested a high degree of ability and statesmanship. He had the confidence of the people to such an extent that he never sought office and never made a political canvass,—this in the day of Sam Houston to whom he was never very friendly and for whom he later developed a profound bitterness. If in the past there may have been doubt as to who played the major rôle in bringing about the annexation of Texas, that doubt is now dispelled—Anson Jones was indeed the Architect of Annexation.

Although an exhaustive bibliography is supplied, no footnotes are used. Repeatedly, short and long passages are quoted and no intimation is given as to the sources. To the average uncritical reader, to whom footnotes might be useless annoyances, this omission would be no loss. It might even be a service. But the historian wonders and wishes. However, the skill with which the quotations are blended with the text is to be admired.

This book adds prestige to that increasing group of historical writers in Texas. It is the result of years of careful, patient investigation. In content, it is solid and complete; in format, it is attractive and substantial. Its language is plain and direct. There is scarcely a sesquipedal word in the entire book. The author writes in evident consciousness of the fact that "adjectives are like leaves on a branch: they may make it beautiful but they ruin it for switching purposes." Emphasis should be placed on the Prologue and the Epilogue, two heart-stirring chapters. The Prologue opens the book with a note of hope mingled with courage. The Epilogue closes with a feeling of pride tinged with sadness. And the chapters in between set down in vivid detail the career of this eminent Texan.

No biography is, or by necessity can be, definitive. New material, new attitudes, and the passage of time shed new light. In the light of our present knowledge, the genial professor of history at Southern Methodist University has spoken the final word on the life of Anson Jones, the last president of Texas. Clearly, he is made to stand out as one of that minority group of selfless individuals whose satisfactions in life are derived from giving of themselves to

others rather than asking and taking from others. He was blessed by superior intelligence and damned by little enough confidence and inclination to take. With the publication of this biography, Anson Jones stands taller.

San Antonio, Texas PAT IRELAND NIXON

CHARLES E. RAVEN. *English Naturalists from Neckam to Ray. A Study of the Making of the Modern World.* Cambridge, At the University Press, 1947. x + 379 pp. $6.50.

OSLER once remarked that we all drag about with us the chains of errors in which we were originally trained. The wisdom of this comment and its almost ubiquitous applicability can hardly be emphasized enough. This is particularly true of a good deal of work on the history of medicine and science, which is vitiated by a tendency to concentrate interest on innovations and advances in technique or theory, overlooking the fact that the state of knowledge at any period is a mixture of survivals of outdated ideas and techniques with advances along specific lines. In other words, the historian must take account of the *transitional* nature of scientific and medical knowledge.

An excellent illustration of how this can be done is exemplified by Dr. Raven's account of the early English naturalists. In studying the history of man's attitude to nature, and especially to the flora and fauna of his environment as manifested in a number of English students of botany and zoology, Raven is able to show how the outlook of the medieval world was assailed and at length transformed into the modern view. Furthermore, he appreciates that it is not by the study of genius that the extent of a movement of thought is best appreciated, but rather that it is in men of more average ability, who can claim to represent rather than to surpass their contemporaries, that the characteristic changes which mark a new era should be examined.

Dr. Raven divides the men whom he studies into three groups: the pioneers (William Turner, John Caius, Thomas Penny, Thomas Mouffet); the popularizers (Harrison, Batman, Lyte, John Gerard, Edward Topsell); and the explorers (John Parkinson, Thomas Johnson and his friends, William How and Christopher Merret). As a result of the efforts of these men, Raven says, "Little by little nonsense was recognized, fables were exploded, superstitions were unmasked; and the world outlook built up out of these elements fell to pieces. The seemingly irrelevant labours of men like Turner or Penny to identify and name and describe bore fruit in a refusal to accept tradition on authority and in an insistence that statements must be based upon observation and capable of verification."

This is a worthy companion volume to Raven's biography of John Ray published in 1942, and should be on the bookshelf of everyone interested in the history of science, medicine, and civilization in general.

GEORGE ROSEN

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